

► LICENSING

# FCC eases Vsat rules

BY KARYL SCOTT  
Washington, D.C. Correspondent

WASHINGTON, D.C. — In a move that may lead to wider user acceptance of very small aperture

terminal (Vsat) technology, the Federal Communications Commission recently issued a declaratory order easing the licensing procedures for Vsat networks. The order streamlines the licensing regulations by reducing the amount of technical information users must submit in order to win FCC approval for Ku-band (12-14 GHz) transmitting and receiving Vsat networks. Users and vendors agree that the new rules, already in See **Vsat** page 7

► CORPORATE CULTURE

# Firms high on drug tests

BY MARGIE SEMILOF  
Senior Writer

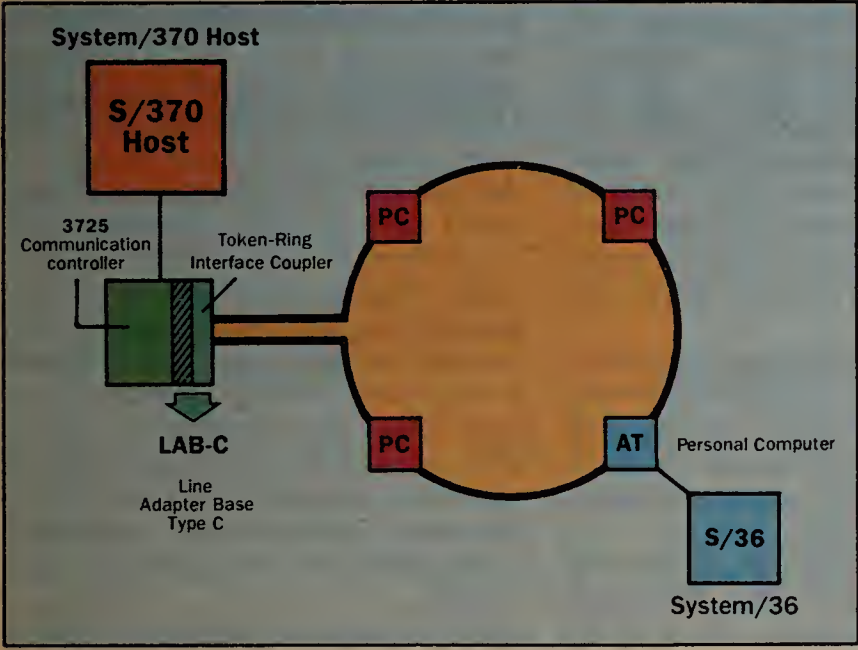
With corporate drug abuse increasing at an alarming rate, it is entirely possible that the person you just hired to manage your network control center is high on

something. Many major corporations are trying to avoid such a risk by administering controversial drug tests to job applicants or testing current employees suspected of substance abuse. See **Drugs** page 36

# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 3, NUMBER 7 APRIL 21, 1986

## IBM Token-Ring Network



► NETWORK MANAGEMENT

# Vsat control

BY JAMES STRATIGOS  
Special to Network World

Network management was once a back-closet afterthought in the world of private satellite networks. Now it is the key to controlling their cost and reliability. Establishing the management function from the beginning represents a major advance in private satellite network design and operation. However, management considerations for satellite networks extend far beyond Continued on page 27

► TOKEN-RING PRODUCTS

# Big Blue drops bombshell

*Analysts see tools as aid to LU 6.2, S/36.*

BY JOHN DIX  
Senior Editor

Analysts say they see promise and jeopardy in the processor networking strategy IBM spelled out last week with the introduction of multiple Token-Ring Network products. The introductions offered few surprises. The Token-Ring Network was provided with a link to System/36 office computers through a dedicated Personal Computer AT and a connection to mainframes through the 3725 Communication Controller. But three salient points seemed to stand out amid the flurry of announcements. Analysts noted that network connections will aid IBM's struggle to establish the System/36 as a departmental processor. But the distant delivery date for that link leaves plenty of time for IBM's office systems competitors to prosper. Finally, they said, the introductions strengthen LU 6.2's emerging role as the communications protocol of choice for distributed systems. The decision to provide Token-Ring See **Big Blue** analysts page 34

*Token Ring links to mainframes debut.*

BY JOHN DIX  
Senior Editor

RYE BROOK, N.Y. — IBM closed the gap last week between its microcomputers and larger systems with the introduction of Token-Ring Network links to mainframes and the System/36 — the first products to be tied to the local network since its introduction last October. The company also announced a network management package for the Token Ring for problem determination and error recovery. In addition, IBM introduced products that increase the distance over which the Token-Ring Network can operate and software that gives its System/88 fault-tolerant processor full Systems Network Architecture capabilities. IBM also cut prices for its PC Network adapter card and enhanced the local net to allow two PC Networks to be linked. Network links to System/370-type hosts are provided through a new subsystem for the IBM 3725 front-end processor. It lets network-attached Personal Computers — the only other devices directly supported on the Token-Ring Network — See **Token Ring** page 33

NEWSPAPER

## NETWORK LINE News

IBM and Ford are joining in a local-area network deal. Page 2.

IBM also says it is adding SNA capabilities to its fault-tolerant System/88, which is manufactured by Stratus Computer. Page 2.

## Features

Bell Communications Re-

search has more than 200 R&D projects in the works. Page 24.  
Data PBXs may lack the luster of their voice cousins, but communications managers are giving them a close look. Page 29.



► LOCAL NETS

# IBM, Ford combine on PC LAN

BY BOB WALLACE  
Senior Writer

RYE BROOK, N.Y. — Ford Motor Co. and IBM last week joined forces to begin implementation of a prototype version of IBM's PC Network that will link IBM Personal Computer XT's and computing resources located in the automaker's Wayne, Mich., assembly plant.

When implemented, Ford's experimental PC Network will share the same broadband cabling media as an existing industrial local-area network, which could eventually support the Manufacturing Automation Protocol (MAP). The two companies began work on the project late last year.

If the Wayne facility project is successful, the prototype broadband, coaxial cable-based, local-area network will be installed in 25 other Ford plants. The success of this project may boost demand for the IBM network among the nation's manufacturers. The cost of the prototype was not available.

The prototype network will support roughly 60 IBM Personal Computer XT's and will be used by plant floor personnel in the Wayne plant by July. The IEEE 804.4-compatible token-passing bus PC Network will utilize a portion of the band-

width of the automobile factory's broadband backbone local-area network.

Roger Zauel, systems and data processing manager for Ford's body and assembly operations division, said the immediate problem for Ford was one of linkage. The auto maker's plants needed an immediate solution to the problem of connecting personal computers on the plant floor to the factory's data processing resources. Zauel explained the networking system requires three different components, two of which are current off-the-shelf IBM products.

The first network component is IBM's personal computer local-area network software, which supports print serving and file serving functions on the PC Network. The second piece of the system is IBM's 3274 Systems Network Architecture gateway. The SNA gateway links the Wayne plant to IBM computers located in the company's corporate computer center in Dearborn, Mich.

The final portion of the system under development is an interface that will allow IBM's PC Network to connect to Ascii devices like the IBM Series/1 minicomputer, the Hewlett-Packard Co. 3000, the Digital Equipment Corp. VAX and other computers Ford uses, Zauel explained.

Zauel stressed that this effort would complement rather than compete with Ford's plans to introduce MAP technology to its manufacturing facilities. "For at least five years, there will not be any overlap between the [PC Network] project and our MAP project," Zauel maintained. □

► SNA

# IBM fault-tolerant System 88 now SNA-compatible

BY MARGIE SEMILOF  
Senior Writer

RYE BROOK, N.Y. — Illustrating the growing importance of fault-tolerant processing, IBM last week announced a string of software products that bring the IBM System 88 into the IBM Systems Network Architecture fold.

The five software packages provide System 88 with full SNA capabilities. They allow the system to act as a host processor, communications processor or cluster controller in an SNA environment. System 88 can be interconnected in a traditional SNA subarea network or communicate on a peer basis with other systems through IBM's Advanced Program-to-Program Communications (APPC).

System 88 now supports the APPC programming interface, which incorporates SNA's LU 6.2 and physical unit (PU) 2.1, and provides for communications over Synchronous Data Link Control (SDLC) links. System 88 can communicate as a peer with other products that support the LU 6.2 protocol.

The System 88 processor is designed to provide uninterrupted online transaction processing capabilities primarily for applications in banking, retailing and other industries.

The product is based on Stratus Computer, Inc.'s Stratus 32 superminicomputer. System 88 was introduced by IBM after announcement of an OEM agreement with Stratus in May. The pact provided IBM with the remarketing rights to several products produced by Stratus.

Evelyn Wilk, a senior manager with Arthur Andersen & Co., said that although many vendors pro-

vide SNA capability for their processors, it is unusual for IBM to provide SNA support for a product not developed within Big Blue's own departments.

"This announcement makes System 88 a fully functioning member of the IBM family," she said.

The announced software includes the IBM System 88 Network Architecture Network Interface Support, which sells for \$3,000 and is a prerequisite for the use of the other products. It provides the operator with a control interface that allows the user to dynamically obtain and modify network configuration information.

The product provides the support needed to make point-to-point connections with PUs defined by SNA as PU 2.1 and PU 2.0. The program provides the communications services for four SNA software products:

- The System 88 Primary SNA allows System 88 applications to exchange data with a variety of terminal control units and front-end processors. It costs \$4,500.

- The System 88 Secondary SNA program, which costs \$5,500, enables System 88 to be connected to an SNA host node to operate as an SNA terminal controller.

- The System 88 APPC software, a high-level program interface that supports peer-to-peer LU 6.2-based communications. The product costs \$8,000.

- The System 88 Communications and System Management software forwards problem alerts to a host Network Problem Determination Application for network management. The product also generates alerts for System 88 hardware and costs \$5,000.

The products will be available in the first quarter of 1987. □

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► EUROPE

# Concord Data to supply Siemens with MAP gear

*Multiyear OEM deal boosts MAP in Europe.*

BY BOB WALLACE  
Senior Writer

PARIS — Concord Data Systems, Inc. last week reached a multiyear agreement in principle to supply Siemens AG of Munich, West Germany, with a variety of Manufacturing Automation Protocol (MAP)-compatible factory-floor equipment. Under the agreement, Concord Data and Siemens will join forces to develop products that connect Siemens factory-floor products to MAP networks.

MAP is a set of protocols designed to support communications between dissimilar vendor equipment on the factory floor. The Technical and Office Protocol (TOP) is a similar set of protocols that support communications between dissimilar equipment in the office.

If finalized, the OEM agreement will be a shot in the arm for the MAP effort abroad. MAP has attracted multinational interest, but has been short on product development. See **Concord** page 33



## ► COMPATIBILITY

# Austec net tool out

**BY MARY PETROSKY**  
West Coast Correspondent

SAN JOSE, Calif. — Austec International Ltd. says a new networking option for its Cobol compiler products will assist users in creating a network of heterogeneous computers.

"We've created a system that will allow users to link machines with different architectures and move applications and data across machines," said Leslie McNeill, chairman of the board and chief ex-

ecutive officer of the Melbourne, Australia-based company. "[The system] provides the ability to read individuals records and to pull programs across the network, regardless of where they reside."

The key to the company's networking concept — dubbed the Conformable Environment — is the Distributed Data Access (DDA) option it has developed for its Acebridge product.

Acebridge is a record-oriented I/O system that interfaces between a computer's operating system and

application programs.

According to McNeill, when Acebridge is used in conjunction with Ace Cobol, Austec's Cobol compiler, Acebridge allows users to port Cobol applications to systems ranging from microcomputers to mainframes, regardless of the operating system used. The code that moves between machines is a compact object code.

Austec's other products include Ace Menu, a combined menu and security system, and Acegen, a Cobol source code generator.

Acebridge includes a file option that supports any language compiler. "We use Acebridge for our file and I/O system for Cobol, but you can connect C, Pascal or Basic to Acebridge," McNeill said. "In a

Unix environment, for example, Acebridge allows applications, regardless of their language, to share a common data base, with full record and file locking."

The DDA option in Acebridge is responsible for physically moving a record or file, and for handling record locking throughout the network, according to McNeill. "When you call a Cobol program, Acebridge with a DDA option will find where the program is among the connected machines, and bring it to you," he said. "You don't have to know anything about where the files are; when the program's executing, it will find them and read the records."

Each computer in the network  
See Austec page 38

## ► ACQUISITIONS

# Nynex inks software buyout deal

**BY SHARON SCULLY**  
Senior Editor

WHITE PLAINS, N.Y. — Nynex Development Corp., an unregulated subsidiary of the New York-based regional Bell operating company, Nynex Corp., last week said it had agreed to purchase Telco Research Corp. for an undisclosed sum. Telco Research is an independent software development and consulting house headquartered in Nashville.

The acquisition follows the company's purchase earlier this year of The Data Group Corp., a Lexington, Mass.-based vendor of standard and custom software systems for companies with large field service organizations.

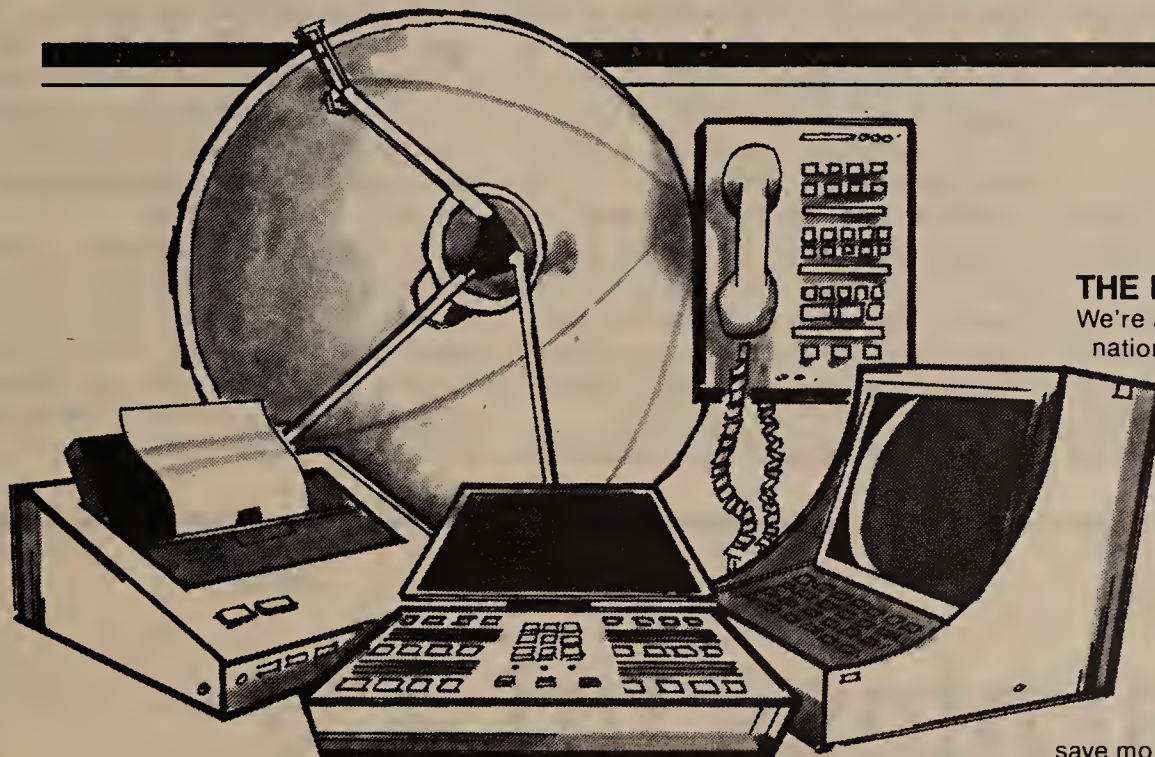
Both companies are being absorbed into the Nynex subsidiary, according to Gad Selig, vice-president of business development for Nynex Development. Like a few other RBOCs, Nynex, one year after its initial founding at divestiture, established a subsidiary charged with evaluating new business opportunities through acquisition.

Selig said Nynex Business Information Systems Co. of White Plains, N.Y., would "work very closely" with Telco Research. That work could include software development support in specific bid situations, Selig said.

According to James Jewett, president of Telco Research, his firm has already begun joint development with Nynex on a specific software project "of a general nature," which he was unwilling to discuss.

Telco Research has a base of approximately 3,000 customers, including about 325 Fortune 500 companies, according to Jewett. Jewett said the company has been distributing "all of its products," primarily network management and control packages, through BellSouth Corp., the Atlanta-based RBOC;  
See Nynex page 38

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► COMPUTERS AND COMMUNICATIONS

# Wang combo bears fruit

*Two-box VS-PBX system bows.*

**BY JOHN DIX**  
Senior Editor

LOWELL, Mass. — Unveiling the first by-product of its investment in switch maker Telenova, Inc., Wang Laboratories, Inc. last week rolled out a packaged system that combines a Wang VS minicomputer and a Telenova 1 Business Communications System.

The so-called Wang Integrated Office Solution uses the data carrying capabilities of the Telenova 1 — now called the Wang Business Exchange — to integrate digitized voice and terminal data over twisted-pair wire and to provide asynchronous terminal users switched access to a VS minicomputer.

This is the first time Wang has supported workstations with telephone-type wire. The move represents an effort to adopt the technology into the Wang product line, according to Richard Connaughton, vice-president of U.S. sales.

**Supports up to 80 users**

Up to 80 combined voice/data users can be supported by the digital, nonblocking Wang Business Exchange. Asynchronous terminals — including Wang's 2110 workstation, industry standard tubes and personal computers emulating asynchronous terminals — are tied

into the switch through Wang Station Sets or through data interface units.

Wang Station Sets are renamed Telenova digital telephones. When outfitted with an RS-232-C option, they can interleave digitized voice with terminal data traffic over two pairs of nonshielded twisted-pair wire, according to Brian Cashman, senior product manager. Each wire pair supports one direction of transmission. Terminals can communicate with a VS at speeds up to 19.2K bit/sec.

Limitations of the switch preclude use of standard Wang VS workstations because the minicomputer typically communicates with workstations at 4.27M bit/sec, Cashman said.

To support the asynchronous terminals necessitated by the speed limitation, the VS is equipped with Wang's Enhanced Asynchronous Device Controller, which was announced last September. The controller supports up to 16 links to the Business Exchange.

While the Wang Business Exchange can support standard analog telephones, the digital Wang Station Set simplifies switch functions like call transferring through instruction menus on an LCD display, according to Cashman.

A second release of the product,

scheduled for availability in the third quarter of this year, will further integrate voice and data functions.

The new control link will provide functions such as the ability to dial telephone numbers from VS applications and light message alert lamps on workstations to indicate voice or text message delivery, Cashman said.

Further integration will also open the door for the development of new voice/data applications. Switch/processor integration could make it possible for a lawyer, for example, to key in account numbers and automatically bill clients for real-time voice and data calls, Connaughton explained.

The system is targeted to branch office applications and small- to medium-size commercial businesses. Use in branch offices, however, may be hindered because nonstandard techniques are required to tie the Wang Integrated Office System into standard switches.

Ted Keane, president and chief operating officer of Telenova, said the system has been tested with equipment from AT&T Information Systems and Northern Telecom, Inc.

An industry-standard EMI analog signaling interface is supposed to be included in the second release.

Wang will initially distribute the product in 10 markets: Boston, New York, Chicago, San Francisco, Dallas, Atlanta, Washington, D.C., Cleveland, Newport Beach, Calif., and Century City, Calif. Cashman said the rollout will be limited to areas where Wang can provide telephony quality support.

A typical 48-telephone system with 16 digital Wang Station Sets, fifteen 2110 asynchronous terminals and a Wang VS 5/Wang Branch Exchange sells for roughly \$85,000. The system is available immediately. ▮

► FINANCIAL RESULTS

# GTE earnings up 4%

**BY SHARON SCULLY**  
Senior Editor

STAMFORD, Conn. — GTE Corp. last week reported a 4% rise in first quarter income, spurred by increased income from both its traditional telephone operations and its communications products divisions.

The company's first quarter results helped offset a \$52 million operating loss related to GTE Sprint Communications Corp., its long-distance unit. The unit reported an operating loss about half that size for the year-earlier quarter.

GTE said first quarter net income increased to \$282.8 million, or \$1.29 a share, from \$273.2 million, or \$1.29 a share, in the 1985 quarter. Revenue increased 8.1%, to \$4 billion from \$3.7 billion, the company reported.

Analysts adopted a wait-and-see

approach to the report, noting it will take at least a year before the impact of the company's recent joint ventures with United Telecommunications, Inc., in Kansas City, Mo., in long distance, and Siemens Communications Systems, Inc., Boca Raton, Fla., in exchange switching, can be determined.

GTE's communications products operations posted a \$27 million before-tax profit, compared with a year-earlier loss of \$21 million, GTE said. The company's local telephone operations reported slightly better performance in pretax earnings — \$692 million on a 6% increase in revenue to \$2.5 billion. That revenue included \$111 million in higher rates, the company said.

Revenue for the communications services group, which includes GTE Sprint's long-distance operations as well as GTE's Telenet, Spacenet and Telemessenger businesses, rose

23% from the 1985 period to \$395 million, the company reported.

The report was "about as expected" said Jack Grubman, an analyst with New York-based Paine Webber. He noted the company's unusually low tax rate for the first quarter "could not be sustained" over a longer term reporting period.

"GTE earnings aren't going to get interesting until next year when we start to see the GTE Sprint joint venture in action, and whatever happens with Siemens comes into play," Grubman, a former AT&T Corp. employee, said.

The size of losses from GTE Sprint, which expanded its customer base to 2.4 million from the year earlier's 1.3 million, surprised some analysts.

Fritz Ringling, an analyst with the Stamford, Conn.-based Gartner Group, said GTE Sprint's losses

See GTE page 8

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Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests.

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Four weeks notice is required for change of address. Please include mailing label appearing on front cover of the publication.

*Network World* can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.




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## ► AT&T

# AT&T results bittersweet

*Flat demand for systems blamed.*

**BY MARY PETROSKY**  
West Coast Correspondent

SAN FRANCISCO — AT&T Chairman Charles L. Brown told shareholders here last week that he isn't satisfied with the company's financial performance. Strong sales in both domestic and international long-distance business were offset by flagging demand for computers, electronic components and office equipment, he said.

The company's results for the first quarter, ended March 31, showed net income of \$530 million, compared with \$354 million for the same period of 1985. Although this represents an increase of 16 cents per share over first quarter 1985 earnings, more than half the increase resulted from a change in accounting rules for pension expenses. A reduction in costs and expenses also helped income figures, Brown said.

"We're not quite pleased with our earnings yet," he said. Brown characterized 1984 and 1985 as "the years we had to make the new AT&T work. I think we are making it work, but not as profitably as we had anticipated."

Brown said he doesn't see any signs of improvement in the computer market, and he wouldn't predict where AT&T would enjoy its most significant growth in the next six months.

When asked if AT&T is satisfied with its share of long-distance business, Brown said, "We run scared all the time; we're not satisfied with anything less than all that we could do."

At the top of AT&T's agenda is retaining a leadership position in the network systems business and improving profit margins on private branch exchange and computer equipment, Brown said.

Several product announcements

in these areas are slated for the coming months. AT&T will be unveiling board products for connecting its computers to its System 75 and System 85, according to Barry Campbell, AT&T's district manager of media relations in Morristown, N.J. A new release of Unix System V, containing expanded networking features, is due to be introduced in June.

The board products are based on AT&T's Digital Multiplexed Interface (DMI), a specification for an interface between computer and PBX equipment introduced two years ago.

DMI supports a transmission speed of 64K bit/sec and is AT&T's "first real implementation of the [integrated services digital network] standard," Campbell said.

AT&T has sold more than 100 licenses for DMI, Campbell said. He added that Hewlett-Packard Co. was likely to be among the first vendors to offer DMI products for its computers.

Unix System V Release 3.0 is a key in AT&T's strategy for connecting heterogeneous computer equipment, said Mike DeFazio, director of software systems product management at AT&T's computer systems division. New features in Unix will allow an application to be developed without regard for the network on which it might run, DeFazio said. Support for a given network media and protocols will be added to an application through "loadable drivers," he said. □

## ► LONG HAUL

# AT&T hikes Tariff 9 line costs

**BY JIM BROWN**  
New Products Editor

BASKING RIDGE, N.J. — AT&T last week instituted a 3.3% across-the-board price increase for the intercity portion of private-line services. The move affects users of analog private lines, Accunet high-speed digital services and Data-phone Digital Services.

The increase is expected to provide AT&T with an additional \$74 million in annual revenue, according to a company spokesman. The new rates resulted from a Tariff 9 rate increase proposal that AT&T filed with the Federal Communications Commission in February. AT&T said the increase was needed to bring earnings closer to the rate of return on investment authorized by the FCC.

The increase came as something of a surprise to Joaquin Gonzalez,

*"It's a  
nominal  
increase, but  
it's still an  
increase."*

## ► VSATs

# FCC grounds Skynet Star Network as AT&T rivals file objections

**BY BOB WALLACE**  
Senior Writer

WASHINGTON, D.C. — AT&T Communications, Inc.'s launch of a two-way, very small aperture terminal (Vsat)-based satellite service (*Network World*, March 24) has been delayed until at least May 1, amid arguments from competitors that AT&T planned to cross-subsidize the offering with revenues from other services.

In a decision last week, the Federal Communications Commission prevented AT&T from initiating its Skynet Star Network Service, which was scheduled to begin April 17. AT&T filed for a tariff with the FCC in mid-March, asking that it be permitted to begin offering the satellite communications service 30 days after the filing.

Several communications service vendors filed petitions objecting to AT&T's Vsat service. The group was comprised of Equatorial Communications Co. of Mountain View, Calif., MCI Communications Corp. of Washington, D.C., GTE Spacenet Corp. of McLean, Va., and Private Satellite Network, Inc. of New York.

Philip Spector, a partner in the Washington, D.C.-based law firm

Goldberg and Spector and legal counsel to Equatorial, claimed AT&T is pricing the satellite service below cost in an effort to win Vsat network market share at the expense of other satellite service vendors. "They are able to price it below cost because, in our view, they intend to cross-subsidize [the Vsat service] with revenues from their near-monopoly [of] voice services," Spector argued.

AT&T filed a detailed response to the other vendors' allegations with the FCC last Monday. AT&T's proposed Skynet Star Network Service would supply customers with all the components needed for a private satellite net. The service was designed to support data transmission at speeds of 9.6K bit/sec, 56K bit/sec and 1.544M bit/sec.

AT&T spokesman Jim Byrnes said he fully expects AT&T to begin offering Skynet Star Network Service on May 1. In its reply to the petitions, AT&T stated, "AT&T's competitors urging rejection have failed to sustain their heavy burden of showing that AT&T's tariff is deficient or unlawful. AT&T has demonstrated that the rates for Skynet Ku-band service will permit full recovery of its costs."

John Cimko Jr., a member of the

tariff division of the FCC's Common Carrier Bureau, said AT&T's request that the tariff take effect in 30 days was unusual. "We started to conduct our review and to sort through the various petitions filed against AT&T," he explained. "We discovered we just weren't going to be able to complete our review and make recommendations to the chief of the bureau about what we wanted to do with the tariff in the time frame involved."

Cimko said the FCC would continue to analyze the issue and study several of the arguments raised in the petitions. The comment cycle was completed with AT&T's reply last week, he said. "We are going to determine whether or not we need any additional information from AT&T before we take action," Cimko explained.

According to Cimko, the FCC has four options. It can allow the service to go into effect in May or it can reject the filing by finding it unlawful. It can suspend the filing for a five-month period to investigate it more fully. The last option is to allow the service to be offered, continue studying the issue and possibly request AT&T to withdraw the service at the end of the extended investigation. □

program director for strategies in telecommunications with Gartner Group, Inc. "It's a nominal increase, but it's still an increase," he said. "No one knew AT&T would go through with something like that." He questioned the need for increasing charges for AT&T's dedicated intercity line service while the company is claiming that installation of additional miles of fiber-optic cable will lessen its operating costs. "Where is the cost benefit from all the fiber-optic plant improvements AT&T keeps talking about?" Gonzalez asked.

Rather than having to raise rates to realize its allowable rate of return, AT&T's fiber-optic cable installations and other measures should allow the company to lower its operating costs and keep user prices stable, Gonzalez said. He stated the move may be a possible push by AT&T to encourage migration to its Software Defined Network, an alternative to private-line service allowing user networks to exist in the memory of AT&T switches, which establish links when needed.

The increase "really signals a strategy move on the part of AT&T," Gonzalez said, one that "tells you there isn't any real competition for large-scale, private-line services." □



**Vsat from page 1**

effect, should add steam to the growing Vsat business.

Under existing rules, network users must license each individual earth station, according to FCC attorney Rosalie Gorman, who authored the order. Because a typical Vsat network consists of several hundred earth stations, the rules have proven costly and cumbersome for both users and the FCC.

The new regulations allow a company planning to build a Vsat network to make a one-time blanket filing. Users will only need to submit "a general narrative application describing the applicant and overall system operation," according to the order.

To file, Gorman said, the applicant requests a license for the hub earth station and a license for each type of Vsat used in the network.

The new regulations also require the network owner to prove his financial ability to complete the project. Users must send the FCC notice as each Vsat site is brought on line.

The FCC's action clarifies guidelines that many users found confusing. "Most customers we deal with are relatively unaware of the regulatory requirements," said Geoff Headley, director of marketing support at the satellite communications division of Harris Corp.

The need for new regulatory procedures became apparent when companies such as Wal-Mart Stores, Inc. and Southland Corp. filed license requests for several hundred earth stations each. The FCC realized it would have been costly and time-consuming to process applications on an individual basis. The legal and technical preparation facing users was prohibitive and threatened to halt the Vsat business in its tracks.

Realizing that existing regulations could impede network sales, vendors such as M/A-Com, Inc. pushed hard to have the rules streamlined, according to Ken Garber, manager for strategic sales development at M/A-Com's telecommunications division. M/A-Com got the ball rolling in 1982 when one of its customers, Schlumberger Technology Corp., wanted to put in a 500-node Vsat network to transmit data collected during oil exploration. M/A-Com managed to convince the FCC to issue a blanket license for the entire system and to grant Schlumberger a 10-year op-

erational license.

"This has been a very positive move," Garber said. "It's helping the Vsat business get started."

Last year, Federal Express Corp. filed for a 25,000-node network to support its Zap Mail document delivery service. Wal-Mart Stores also filed for a 1,500-earth station network and Southland was looking to install 8,000 ter-

minals to link its many Seven-Eleven convenience stores.

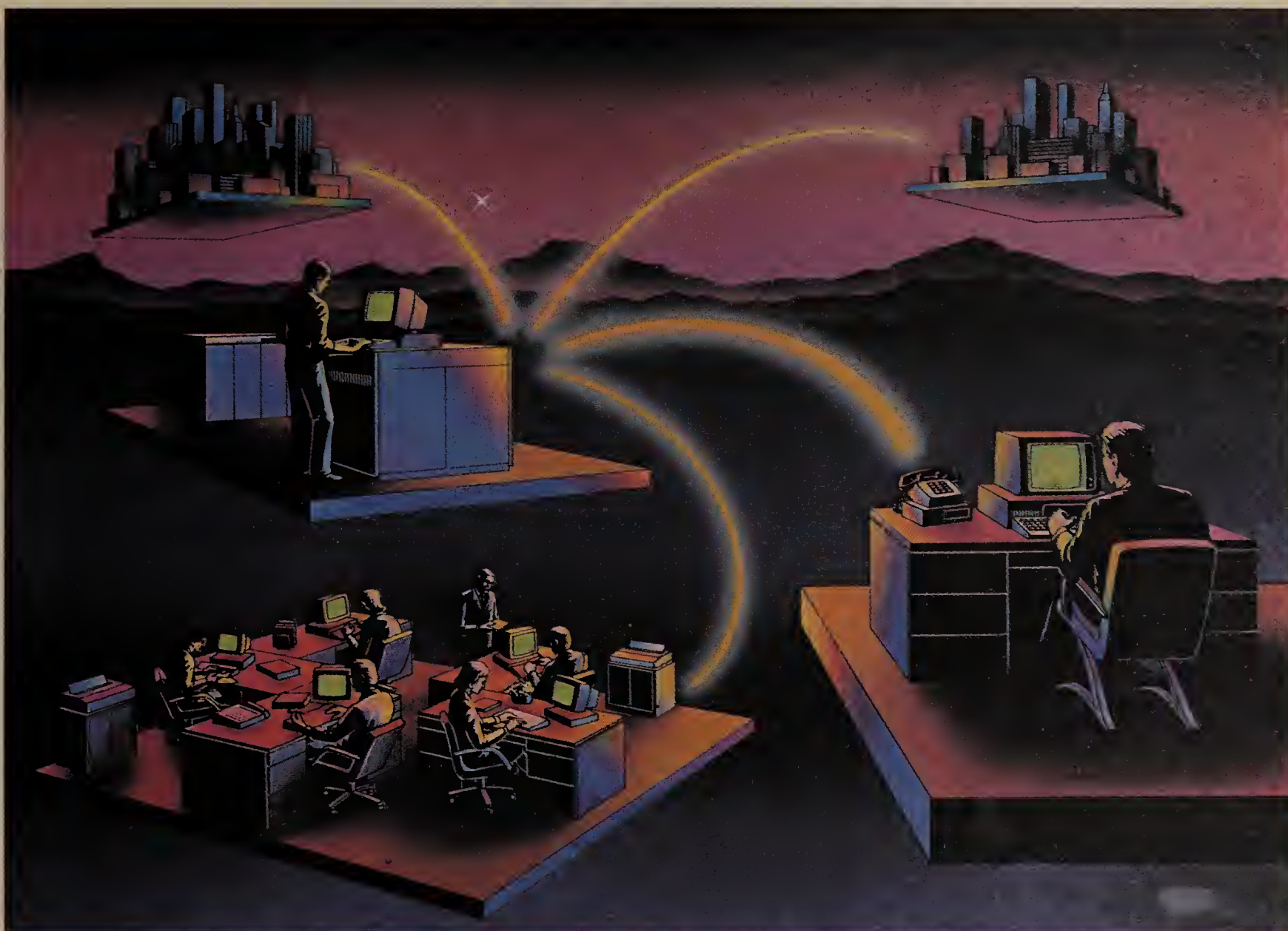
Other firms awaiting license approval are Telecom General Corp., Satellite Technology Management, Inc. and American Satellite Co. Comsat is providing American Satellite with Vsat equipment, which it will resell to Halliburton Co., along with satellite transponder capacity. The

network will transmit data from Halliburton's oil fields to a central host operating in an IBM Systems Network Architecture and Synchronous Data Link Control environment.

The FCC declaratory order does not apply to earth stations operating in the 4-6GHz C-band range. The FCC in September streamlined the order for C-band networks also. But because

of concerns over C-band interference, applicants must still apply for individual earth station licenses, according to Gorman.

The Ku-band is used primarily for domestic fixed-satellite service. The only other users of this frequency are broadcasters using mobile satellite transmission for special news coverage on a temporary, intermittent basis. □



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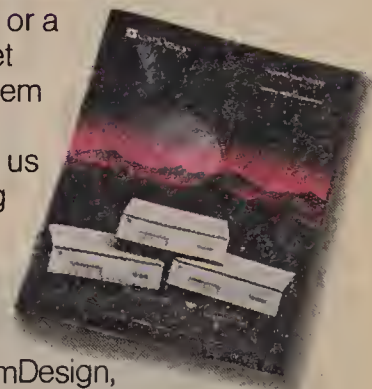
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► LOCAL NETS

# ITT offers LAN supermicro

BY MICHAEL FAHEY  
Staff Writer

SAN JOSE, Calif. — ITT Information Systems last week introduced the ITT Xtra XL, a supermicrocomputer running Microsoft

Corp.'s MS-DOS and Xenix. The ITT Xtra XL is designed to maximize computing power in local-area networks and shared processor environments.

The system, based on Intel Corp.'s 80286 micro-

processor, is available in four models, two of which can be used as local net servers. The other models can operate as multiuser systems.

ITT has tested the ITT Xtra XL as a server with

Novell, Inc., 3Com Corp., Nestar Systems, Inc. and IBM Personal Computer.net software, according to Bill Daniel, sales support director for ITT. "We will continue to test network packages as they are identified to us by buyers and dealers," Daniel said.

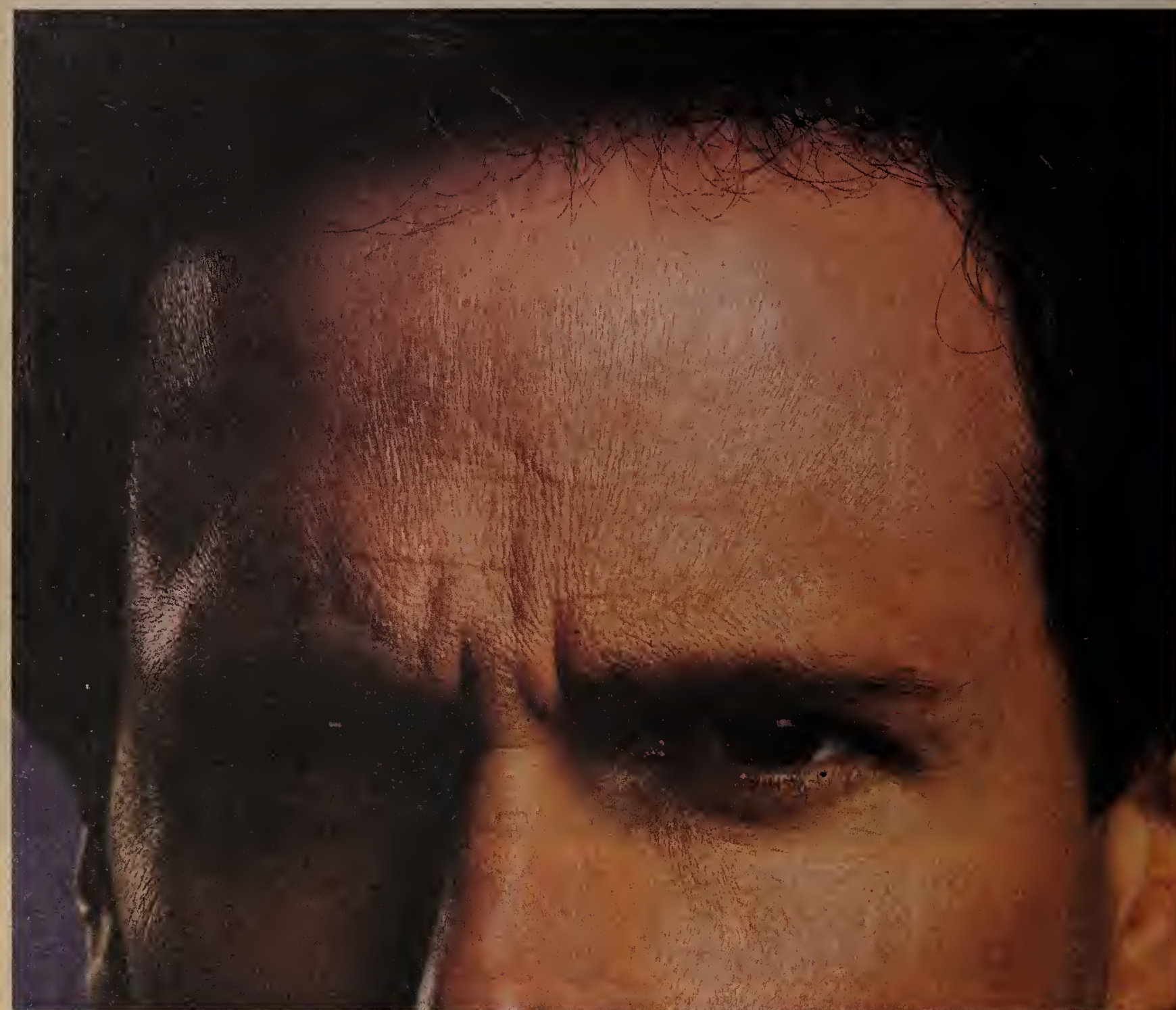
The ITT Xtra XL can be configured with 640K bytes or 1.6M bytes of random-access memory, a 1.2M-byte

floppy disk and a 40M-byte or 72M-byte hard disk. Disk storage is expandable to 144M bytes. The multiuser models include a 60M-byte streaming tape backup and allow for the use of up to four coprocessor boards.

The ITT Xtra XL features 8 MHz, zero-wait-state memory and dynamic disk I/O caching. It also features an average hard disk access time of 28 msec and an optional 80287 math coprocessor. The spokesman said the 8 MHz 80186-based coprocessor offers improved throughput speed in multiuser configurations.

The mass storage capacity of up to 144M bytes more than doubles the standard offering of other 80286-based machines for disk-intensive applications. According to Mark Fowler, senior vice-president of product management and development for ITT, the ITT Xtra XL's expanded memory and improved disk performance "eliminates bottlenecks found in multiple terminal performance."

Pricing for the ITT Xtra XL systems begins at \$5,299.◻



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### GTE from page 4

suggested GTE had not progressed as far on the merger as it had anticipated, and that it had "underestimated costs associated with the merger."

GTE announced in January a partnership with United Telecommunications' US Telecom long-distance unit, which it said would combine subscription bases, costs, network and transmission facilities. At the time, the company said it expected to increase its market share, while gaining immediate and measurable economies of scale.

However, while GTE reportedly had written off a large portion of what it spent to build GTE Sprint's network, it now plans to spend hundreds of millions of dollars rebuilding and expanding a fiber-optic network for the combined US Telecom and GTE Sprint operations.

The venture's construction budget has caused analysts to speculate that the company will have to purchase other smaller long-distance companies in order to expand its customer base fast enough to afford the building.

The agreement between GTE and United Telecommunications allows for additional partners, and some industry sources have said ITT Corp.'s long-distance unit is a likely candidate.◻











# INDUSTRY UPDATE

## What price automation?

General Motors Corp. has ordered employees to reduce discretionary spending, including travel and out-of-office meetings, in a companywide effort to cut costs. The measures reflect GM's bottom-line concerns at a time of bulging inventories, slumping sales and trimmed production schedules at several plants. The company has spent more than \$7.76 billion on acquisitions in the last two years, including the purchase of Electronic Data Systems. Moreover, GM plans capital outlays of more than \$10 billion worldwide this year as part of a \$40 billion factory and office automation budget over the next five years.

### ► CUSTOMER PREMISES EQUIPMENT

# Sonecor slims down

*Early entrant to CPE mart will deal away out-of-state operations in move aimed at streamlining, trimming losses.*

**BY SHARON SCULLY**  
Senior Editor

NEW HAVEN, Conn. — Sonecor Systems, one of only two former Bell System companies permitted to enter the customer premises equipment market in early 1983, last week said it had agreed to sell its out-of-state branch operations in an effort to streamline operations and reduce operating losses.

Sonecor, a unit of Southern New England Telephone Co. (Snet), said it will sell operations and adjunct customer bases in New York and Burlington, Mass., to Nynex Business Information Systems Co., the New York-based unregulated subsidiary of another former Bell System company, Nynex Corp. Branch locations in

Washington, D.C. and Philadelphia will be sold to Philadelphia-based independent interconnect contractor Gray Communications Co., a unit of Sargent Electric Co. Financial terms of the agreements were not disclosed.

According to Charles Harrison, Sonecor's president, the agreements represent a "decision to focus his division's resources on the Connecticut telecommunications market, where it currently serves several thousand customers." According to Michael McCann, a spokesman for the company, about 10% of Sonecor's customer base is served by those out-of-state offices the company is selling.

Sonecor was permitted to sell customer premises equipment as an unregulated subsidiary one year earlier than subsidiaries set up by the

seven regional Bell operating companies, due to AT&T's equity ownership in the company. The company sells a customized version of the NEC Corp. NEAX 2400 private branch exchange, TIE/Communications, Inc. PBXs, AT&T's Dimension PBX, and the Mitel Corp. PBX product line. Both Nynex Business Information Systems and Gray Communications currently carry similar product lines.

According to McCann, Sonecor opened the out-of-state offices during the time the RBOCs were barred from the market. "At that time, it made sense for us. But since then, RBOC competition has been formidable, especially on their own turf, where they had the home-field advantage." McCann was referring to Nynex Business

See **Sonecor** page 10

### INDUSTRY EYE W. SPENCER RICE

## Centrex shines with pricing changes

**F**ar from having run its course, the new Centrex — or Enhanced Centrex — permitted by the Second Computer Inquiry and modifications, is making a strong comeback, thanks to new architectures, new software, new electronic telephones and new pricing schemes.

Enhanced Centrex offers what amounts to a shared, cost-effective and flexible communications system equaling the newest third-generation private branch exchanges and rivaling the older second-generation machines that still hold the majority of market share in North America.

The restructured Bell System companies, or regional Bell operating companies, now offer data switching, local-area networking, fiber optics, protocol conversion, centralized cost accounting, centralized attendant service and much more.

The hardware is being driven toward integrated services digital network compatibility, offering the potential for national and international data transmission when coupled with AT&T's backbone networks. AT&T's net-

works often employ the same switches as their telephone company counterparts in local, state and local access and transport area transmission.

### A flexible tool

The new software promises on-demand, wide-area networking capabilities, which, when coupled with on-demand 56K bit/sec channels — and soon to be available on-demand 1.544M bit/sec channels — makes for a very flexible and money-saving tool in the arsenal of the corporate telecommunications and information systems manager.

Not every company needs a Centrex system, and some that would like to use Enhanced Centrex may not be able to. However, companies that have many large to relatively small offices in a widespread state or local geographical distribution may be good candidates for Enhanced Centrex.

Companies with several temporary leased locations also may opt for the flexibility of Enhanced Centrex due to their nomadic situation. New Centrex rates can be coupled with

month-to-month service charges. Even companies with very large installations in a vicinity, such as a campus or an industrial park, might like the shared Centrex approach that leaves highly valued floor space for productive company uses and obviates the need for a PBX technician, full-time maintenance man and extensive telecommunications staff.

The new Centrex can even offer networks similar to IBM's Electronic Tandem Network (ETN), without a company having to purchase PBXs.

Unfortunately, there are more things to consider before pursuing a Centrex communications solution.

First, not all central office (CO) locations have the new hardware and software that enhances the Centrex system. If a company has several offices with more than one CO serving each location, the communications manager must determine the availability of the various software packages for the Centrex switches and hardware involved.

See **Rice** page 10

### BRIEFS

KANSAS CITY, Mo. — United Telecommunications, Inc. has filed a registration statement with the Securities and Exchange Commission (SEC) for \$400 million in debt securities.

Proceeds resulting from the offering will be used for general corporate purposes and to reduce short-term debt to finance the company's network construction program, according to the company.

WASHINGTON, D.C. — MCI Communications Corp. has filed a registration statement with the SEC to offer \$500 million in subordinated debentures. The company said it may use proceeds to reduce long-term debt or to finance construction of the company's digital fiber-optic network.

The company recalled \$475 million in debt at the end of last year, and has not gone to the public for funds since 1983, a company spokesman said. Current debt level, not including the \$500 million subordinated, is \$1.4 billion, he said.

Funding for construction of the company's digital fiber-optic, satellite and terrestrial microwave network was approximately \$1 billion in 1984 and 1985, and a similar amount is earmarked for the current fiscal year, the spokesman said. To date, the company has in place 3,000 route miles on its domestic digital network.



**Sonecor from page 9**  
Information Systems and Bell Atlantic Corp. operating companies in New York, Pennsylvania, Washington, D.C., New Jersey and Massachusetts.

Sonecor, which is part of Snet's diversified telecommunications group (DTG), has been operating at a loss since its inception, according to McCann. He said aggregate net revenue for Snet's DTG in 1985 was \$76.9 million, with a \$26 million net loss. Other Snet operations included in DTG are a year-old joint venture with CSX Railroad to build and operate Lightnet, Inc., a national fiber-optic network — a so-called carriers' carrier network.

"We expect our Lightnet venture to progress very well, and expect it

to be profitable this year," McCann said. "Sonecor Systems hopes to break even this year."

Following completion of the sales, Sonecor may continue to sell in territories outside its Connecticut home state, McCann said. "Generally speaking, we want to concentrate on the home field. However, we may go outside of the state on a very selective basis. For example, if there were a potential customer in a neighboring state who wanted us to bid a premises-based 5ESS or do some kind of fiber-optic local-area networking, we would bid that." Asked if the company was currently working on such a bid, McCann said it has a potential customer, but he could not divulge the customer's identity.

A spokesman for Nynex Business Information Systems said the company saw the acquisition as "a good fit." He said the company essentially was buying Sonecor customers served by its New York and Burlington, Mass., offices, and that he expected the companies to continue to compete on each other's territories.

Gray Communications also sells the NEC and Mitel product lines. The company recently signed a distribution agreement with CXC Corp. of Irvine, Calif., to sell the fifth-generation Rose switch.

Gray Communications had about \$17 million in 1985 sales, according to President Fred Sargent. He said the deal with Sonecor would give his company a customer base in


Washington, D.C., a new territory for them. Sargent also said the company's current base includes about 3,000 customers, with installations of up to 2,000 lines.

"This whole thing came up very suddenly," Sargent said, "literally a matter of days ago."

Sargent said he was unaware of details concerning a report that certain Sonecor employees had offered to purchase the Philadelphia and Washington, D.C. operations. Gray Communications has agreed to buy.

Sonecor's McCann said the company had approached a number of vendors regarding purchase of its out-of-state operations, but that such negotiations were under non-disclosure agreements.

Spokesmen for both Gray Communications and Nynex Business Information Systems said they would interview Sonecor employees regarding potential future employment after the agreements are finalized, but that no binding arrangements had been made. □









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**Rice from page 9**

The dominant models of hardware for Enhanced Centrex services are the 1AESS and 5ESS from AT&T Technologies, Inc. and the DMS series from Northern Telecom, Inc.

Recently, however, much attention has centered on the NEAX 61 from NEC Corp. and the EWSD from Siemens Communications Systems, Inc. Lately, the newest Ericsson Information Systems, Inc. switches have profited from the apparently more aggressive support of ISDN services.

The software packages for these machines vary in their release dates and availability. Compatibility between machines from different manufacturers is a definite issue. Even compatibility between different models from the same manufacturer should be investigated. For instance, an ETN network cannot be created between a 5ESS and a 1AESS, unless both machines have the appropriate software to allow them to provide ETN features.

If the available and scheduled features for the CO switches that figure in a company's communications system prove compatible with the company's needs at each location over time, Enhanced Centrex can be a very good fit.

Studies done by industry consultants, including S&R Consultants Ltd., indicate that Enhanced Centrex can be more cost-effective than a modern PBX if all the costs of owning a PBX are considered.

The larger the communications system and the more often a company must relocate, the more sensible Enhanced Centrex becomes. Cash flow analysis will prove Centrex cheaper over a period of up to five years from the time of acquisition. □

Rice is the senior partner of S&R Consultants Ltd., a Madison, N.J.-based communications consulting firm.



# TELECOM TRENDS

From the "Oh no, I never knew it was a problem" department, BioHygenix, Inc. in Fremont, Calif., has announced sanitary covers for telephones that control germs and bacterial growth. "The age-old problem of picking up germs from a well-used public or even private telephone may soon be over," BioHygenix reports.

## STANDARDS

# 802 chief speaks out

Chairman Maris Graube discusses standards committee's strategies, future networking challenges.

In the six years since its inception, the Institute of Electrical and Electronics Engineers (IEEE) 802 local network committee has established four national standards that are well on the way to adoption by the International Standards Organization (ISO). Those standards are the 802.2, the logical link control protocol used in each of the other three standards; the 802.3, for Ethernet-type networks; the 802.4 for token bus nets as used in factory automation; and the 802.5 token-ring bus, as used by IBM and other vendors. For an update on the IEEE 802 activities, Network World Senior Editor John Dix caught up with Maris Graube, the chairman of the IEEE 802 commit-

tee and an independent network consultant in Forest Grove, Ore.

### What is the IEEE 802 committee pursuing now?

We are working in various areas related to local networks, including a metropolitan-area network, 802.6, that is going to be a 40M bit/sec fiber-optic slotted-ring net able to carry real-time voice. We are also involved with internetworking in 802.1, standards for interconnecting local networks of the same or different types and linking local nets with wide-area networks.

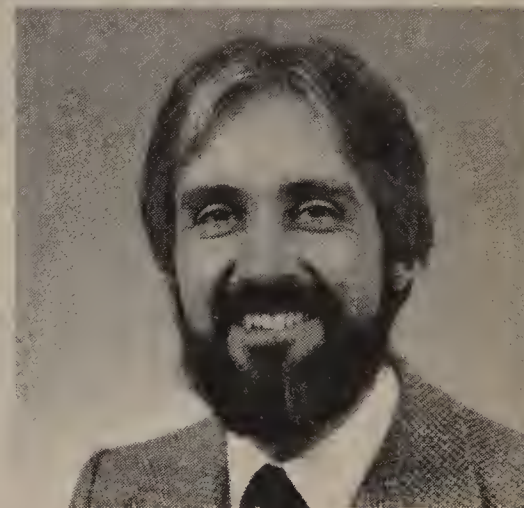
### What about network management?

The question of how to manage lo-

cal nets is also being addressed in 802.1. We need a network management protocol that allows various parameters to be downloaded to network devices and a way for these devices to be interrogated by a network manager computer to find out how they are operating. The standard will have a general structure that will be tailored to each of the particular 802 media and media-access methods.

### Where does work stand now on 802.6 and 802.1?

Drafts are available already. After doing more technical work on both, they will go through internal balloting within 802, then be sent out for balloting within the IEEE and



Maris Graube

then go through the approval process of the IEEE standards board. We'll probably see standards coming out in these areas within a year or a year and a half.

**What's the relation of IEEE 802 to General Motors Corp.'s Man-**  
See Graube page 12

## CROSS TALK

JOHN DIX

# Fiber capacity glut may push users to rethink future net schemes

The nation's long-haul circuit capacity will increase 700% by the end of the decade if all of the fiber-optic networks planned are actually installed. The expected capacity glut will drive down the cost of high-speed digital services and force users to rethink their networks.

Even if construction financing for some of these fiber networks dries up halfway there, circuit capacity can be expected to quadruple, at least, in the next four years, according to John McQuillan, president of McQuillan Consulting in Cambridge, Mass. Within that same time frame, the cost of 1.54M bit/sec digital T-1 circuits will erode by 50%.

McQuillan says T-1 and higher speed digital services represent the 1980s equivalent of the old AT&T Telpak tariff. Telpak was a bulk billing option for large users of leased lines. But Telpak's one-time 28% discount pales compared with potential T-1 savings today. As a rule of

thumb, a T-1 line with a capacity equivalent to 24 voice-grade leased lines costs the same per month as 12 to 14 individual dedicated lines.

As in manufacturing industries, unit prices decrease as the purchase volume increases. Bulk capacity above T-1 offers users even greater savings. McQuillan said AT&T's recently tariffed T-5 service — a 45M bit/sec service with the capacity equivalent of 28 T-1s or 672 voice channels — costs only as much as seven T-1s.

Those kinds of savings will require customers to reconsider use of high-speed digital facilities, even if it involves the redesigning of their networks. Customers who can't come up with the traffic to justify T-1 and higher speed links may be wise to form consortiums to share the capacity.

Clearly, the economic incentive for use of bulk digital links will become better over time.

The price of facilities will continue to erode as capacity installation outpaces growth in demand. Future rate hikes for analog lines, particularly short-haul dedicated lines, will make bulk digital lines even more attractive.

Interestingly, the pending circuit wars may obsolete some recent tricks of the trade. Communications managers have been seeking long-term contracts to stabilize rates and insulate against future increases. Now, however, rates are falling as carriers compete for customers to feed their voracious appetite for capital.

Deals abound. According to one user, the National Telecommunications Network — a consortium of regional fiber carriers — is already offering 20% contract discounts. Customers may be wise to shun contracts of longer than two years, or they should at least build in escape clauses.

## REGULATION

# FCC shuffle

BY JOHN DIX  
Senior Editor

The Federal Communications Commission and several of the former Bell operating companies are doing some fancy two-stepping in Washington, D.C. in an effort to loosen binding regulations, according to the *Washington Update*, a bi-monthly newsletter published by the North American Telecommunications Association.

Arguing in favor of lessening regulations, the FCC is proposing to allow the regional holding companies to market network services together with nonregulated equipment. Today equipment must be sold through a separate subsidiary. The separation requirement is meant to keep the holding companies from subsidizing competitive equipment ventures with revenues generated from monopoly local services.

The FCC says the cross-subsidization fear is minimized by the divestiture requirement that prohibits the former Bell companies from manufacturing equipment, according to Adam Kernan-Schloss, *Washington Update* editor.

See Nata page 12



**Graube from page 11**  
**ufacturing Automation Protocol and Boeing Computer Services Co.'s Technical and Office Protocol?** GM and Boeing have chosen a subset of the IEEE and ISO standards that is applicable to the automated factory, in the case of MAP, and the office environment, in the case of TOP. MAP has adopted 802.4 and TOP has chosen 802.3. They both

use the same link-level protocol.

**What is the IEEE's role, if any, in the recently formed Corporation for Open Systems?** There isn't one from an official IEEE point of view. Many of the people who come to 802 meetings do, however, work for companies that are members of COS. COS will do some good

things for us as time goes by. But without sounding like a disbeliever, I am standing back to see what COS will really do.

**Are there any major local network issues that have yet to be resolved?** Various 802 groups are interested in fiber optics. It appears that fiber optics is starting to mature for lower speed data communications

— 100M bit/sec and below. The technology is starting to stabilize, and we can start looking at standards for things like fiber sizes, various characteristics of the cable and connectors, specifications for how to measure performance, install and maintain cables, and a myriad of other issues concerning the physical cable plant itself. The task is to get vendors

together to choose some subset of the hundreds, if not thousands, of different cable connector types out there to establish something users can buy and use without having to be engineers.

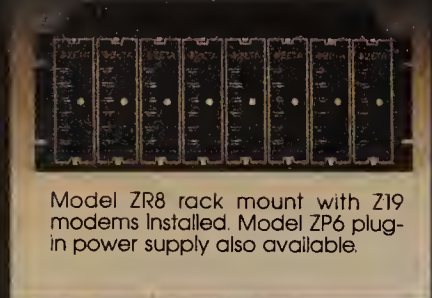
**Are there other pressing local network issues?** Computer manufacturers use connectionless protocols, where data is sent without having to go through long procedures to set up circuits. Telephone companies advocate connection-oriented protocols. These worlds will clash when you talk about interconnecting local- and wide-area networks. The whole issue is still fluid. MAP has chosen connectionless protocols, but AT&T and others are still beating the drum for connection-oriented [protocols].

**Where will local networks lead?** Various market-research people have tried to characterize the local-area network marketplace. It strikes me that there really isn't a local network market. We're going through a transition. People sell wire and add-on boards today. But as time goes by, local-area networking won't be external to computer devices; it will become part of them. Nobody talks about the RS-232 market. Computers have that feature. Someday you will simply find local network spigots coming out of things like personal computers, printers and file servers. I think you see this happening with the merger 3Com [Corp.] and Convergent [Technologies, Inc.] tried to put together. As a stand-alone business, local networks are on the way out. **Z**

**Nata from page 11**  
Interestingly, while using the manufacturing ban to parlay criticism of the joint marketing plan, Fowler and many of the regional holding companies are encouraging Congress to pass bills that would lift the manufacturing restriction, Kernan-Schloss said. "When they're on the Hill pressing for permission to manufacture equipment, the regional Bell operating companies insist that the FCC's separate subsidiary rules will protect consumers and competitors from abuses," the editor said. "Never mentioned in those discussions is the regional company's ferocious lobbying downtown to eliminate the separation rules." **Z**

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# DATA DELIVERY

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**Frank Dzubeck**  
president  
Communications Network Architects, Inc.

► HIGH-SPEED MODEMS

## Fast moves

*Fastlink users cite modem's speed, versatility.*

**BY MICHAEL FAHEY**  
Staff Writer

A new release of a high-speed asynchronous modem that almost doubles the previous release's transmission speed has saved two early users time and money.

The modem, Digital Communications Associates, Inc.'s Fastlink, enables IBM Personal Computer users to send information to other microcomputers, mainframes and mini-computers over dial-up telephone lines at speeds up to 18K bit/sec, without requiring data compression.

The earlier version of the modem operated

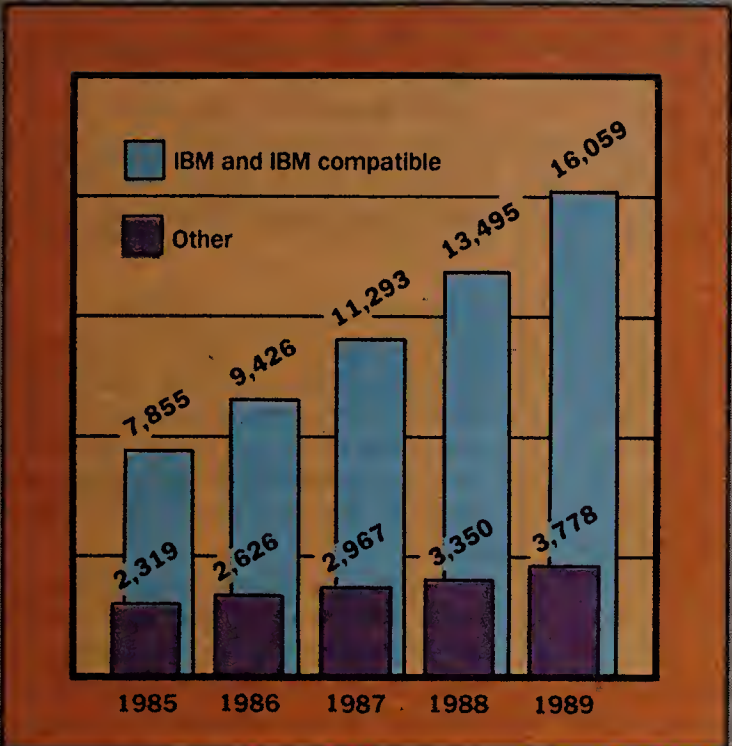
at speeds up to 10K bit/sec.

For Kermit Coe, communications manager at Gerehard Industries, Inc., a Fort Worth, Texas, company that provides well measurement and testing services to the petroleum industry, Fastlink met the need for a high-speed modem that supported three media: satellite, microwave and dial-up lines.

Before the company began using Fastlink, Gerehard engineers at well sites would store information on magnetic tapes. The tapes were then carried to a computer center where they were transformed into plotter output that was often 10 to 12 feet long, said

See **Fastlink** page 14

Communications processor market  
Units shipped, 1985 to 1989



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

DATA DIALOGUE  
**PAUL KORZENIOWSKI**

## COS rolls merrily along

The Corporation for Open Systems (COS) is merrily rolling along as more than 40 companies have joined its fold.

Vendors and user organizations have not been deterred by expensive COS membership fees. For companies that earn less than \$25 million, the fee is \$25,000. The membership cost doubles for firms that earn between \$25 million and \$150 million. Companies that earn more than \$150 million have to fork over \$125,000 in 1986 and \$200,000 in 1987.

What are these organizations receiving for their investment? Currently, not very much, because COS represents more possibilities than certainties. Even as companies line up in support of COS, exactly how the organization will be structured and what tasks it will perform remain murky.

Some vendors see COS as a testing agency. Others think the organization is a standards-setting body. Most expect COS to aid them, but are unsure of how that will be done.

In theory, COS will establish test suites for various layers of the International Standards Organization (ISO) models. Test suites, common in the software industry, are guidelines that de-

termine how closely one product adheres to a set of specifications. COS test suites will adhere to layers of the ISO's Open Systems Interconnect (OSI) model. Products that adhere to the model will be certified and sold with stickers as are products that receive the *Good Housekeeping* Seal of Approval.

In order to develop test suites, COS will have to establish a subset of the ISO model, because it contains 20 to 150 options for each of the seven layers. A.G.W. Biddle, president and executive director of the Computer and Communications Industry Association, said the COS model would be broader than the Manufacturing Automation Protocol (MAP) model devised by General Motors Corp. for factory automation. Biddle claimed that the COS model would serve financial and commercial organizations as well as the factory.

Biddle added that the vendors would be able to build on the COS model and differentiate their COS wares from those of competitors.

A broad swipe at an elaborate network model will probably help no one.

To gain user acceptance, COS will have to ensure that COS-approved products easily work

with one another. By taking a wide cut at the model, COS would leave vendors with too many options. Products that incorporate certain options may be incompatible with offerings that supply only base COS-approved functions. To ensure product compatibility, a narrow model, not a broad one, is needed.

Even with a narrow model, compatibility problems arise. MAP is a narrow ISO model. Yet, there have been instances when devices conforming to MAP specifications have not worked together. Last fall, during a demonstration at Autofact '85 in Detroit, 21 vendors hooked their equipment onto a MAP network. Some of the equipment malfunctioned.

If COS does take only a broad swipe at the ISO model, users may be saddled with the responsibility of determining just how compatible COS products are. This situation seems to defeat the reason for establishing the organization.

There are also some uncertainties about who will actually test equipment and ensure that it conforms to COS standards. Biddle does not see COS as the testing agent; instead, testing would be contracted out to third

See **COS** page 14

► EMULATION

## Rival woos DCA's Irma customers

**BY MICHAEL FAHEY**  
Staff Writer

Adopting an age-old car dealing technique, Attachmate Corp. is offering Digital Communications Associates, Inc. customers \$800 to trade in their Irma boards for the Attachmate 3-N-1 Coax Adapter.

Mike New, director of marketing, said that Attachmate distributors would deliver 3-N-1s to Irma users and allow them to use the product for 10 days before trading in their old boards. Attachmate typically costs \$1,195; however, with the trade-in, the price drops to \$395.

Is the move a feeble attempt to shore up a weak-selling product? New claimed that the 3-N-1, announced in November, has been selling well, at the rate of 1,000 units per month.

Doug Lifton, product marketing manager for Digital Communications, dismissed the rebate offer as "an attempt to buy a share of the market. Attachmate doesn't have the presence of an IBM or a Document Content Architecture in the micro-to-mainframe connector market," Lifton said.

Digital Communications boasts total sales of more than 250,000 Irma boards, according to Lifton. □



**Fastlink from page 13**

Coe. "Now we take data from the magnetic tapes, transfer it to the hard disk of a PC and transmit the information to a customer's PC," Coe said.

**Reduced idle time brings savings**

According to Coe, Fastlink saves from six to 48 hours in delivering information from well sites to Gerehard's customers, who must stop drilling until they receive the information.

With rig time costing up to \$100,000 per day at offshore sites, any reduction in idle time provides great cost savings, Coe said.

Gerehard Industries evaluated a number of different modems before settling on Fastlink, which was the

only product that enabled the company to transmit data over its own satellite, as well as the microwave and telephone lines at rig sites, Coe said.

"You could get a modem that would work on one or the other, but not all three," Coe explained. "We can't have a customized modem for each job."

**Pleased with the speed**

In addition to its flexibility, Gerehard is pleased with Fastlink's speed, according to Coe. The company periodically downloads software to its branch office in Brazil. "When we transmit via satellite, our time costs \$10 per hour," Coe said.

"We like to get up, get a link,

send and get off."

Ken Manning, president of Transport Consultants Services, Inc. (TCI), a Bethesda, Md.-based company that provides shipping cost information to the trucking industry, was also impressed by Fastlink's speed.

"At least one of our customers was complaining that there wasn't enough time in the day to cost all of their shipments," Manning said.

"They had a choice of buying another microcomputer so they could have two lines coming in, or they could make the one line more efficient. They decided to make the one line more efficient." Despite the attraction to Fastlink's speed, TCI transmits data at only 9.6K bit/sec, rather than at the 18K bit/sec rate

the product supports.

Prior to installing Fastlink, TCI had revamped its operation from interactive teleprocessing to file teleprocessing, which, according to Manning, "allowed our customers to be much more efficient in terms of communications and computer charges."

Rather than paying for the time needed to create a file, they were only charged for the time needed to transfer the file.

"If they are transferring very large files, they almost have to have Fastlink," Manning said.

"In a file containing 100 shipments, without Fastlink it would take about 50 minutes at 1,200 baud to upload the file to our computer, run it through, be costed and then downloaded back to the customer's PC."

**Static caused speed loss**

Manning considered a few other modems, but found that many shared a major shortcoming. Whenever the modems encountered static on the lines, their transmission speeds would drop from 9.6K bit/sec to 4.8K bit/sec.

"The big thing about Fastlink is that if it can't operate at 9.6K bit/sec, it drops to 9.5K then to 9.4K and so on in hundred baud increments," Manning said.

"That is important to us. With one customer in the Shenandoah Valley in Virginia, our average transmission speeds are 6.5K to 7K bit/sec. If we were using another modem, we'd only be operating at 4.8K bit/sec."

Manning said one of his users expects Fastlink to pay for itself in four months.

"In our case, we weren't going to reduce any of our costs, but we get so much business from that customer, we bought it as an investment," he said. □

**COS from page 13**

parties. How reliable these agencies will be is certainly open to question.

Vendors will be one group of testers. Those companies that pay the most expensive membership fee will be able to be certified as testers.

Historically, vendors have not proven to be very objective in evaluating their own equipment. So a complex system will be needed to ensure that vendors accurately label their wares. However, no specific plans have yet been established.

**Another shortcoming**

Another COS shortcoming is the lengthy delay between current possibilities and actual test implementations. Products with COS stickers will not be available until the first quarter of 1987. At that time, only a limited number of tests are scheduled for completion.

The broad support that COS has gained to date seems to ensure that COS-certified products will one day appear. However, in addition to the COS label, they should also include the warning, caveat emptor. □



# Confused about network management?

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- Multiplexer companies and switch manufacturers all have computer-controlled systems they label "network management." But their goal is to sell more muxes and more switches.
- Computer companies sell host and front-end software packages for "network management." Their aim? To sell more computers and more software.

So although *your* main interest is the network as a whole, *theirs* is just the limited part they sold you. While *your* prime task is to manage the entire network, *theirs* is to sell you more equipment—for completely separate pieces of the network. By using the "network management" label, they make their system sound like a total solution. But it's not.

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# FACTORY COMMUNICATIONS

"We started planning for [the Livonia] installation long before MAP was anything more than a couple of ideas being kicked around."

**Richard Maisonville**  
Computer Integrated Manufacturing Section  
Ford Motor Co.

► MANUFACTURING

## Net by Ford

*Automaker's 8-mile broadband local net to link 800 factory devices.*

LIVONIA, Mich. — Ford Motor Co.'s most advanced manufacturing facility is implementing a broadband local-area network that will control the operation of some 800 computerized factory machines in the automaker's transmission and chassis plant here.

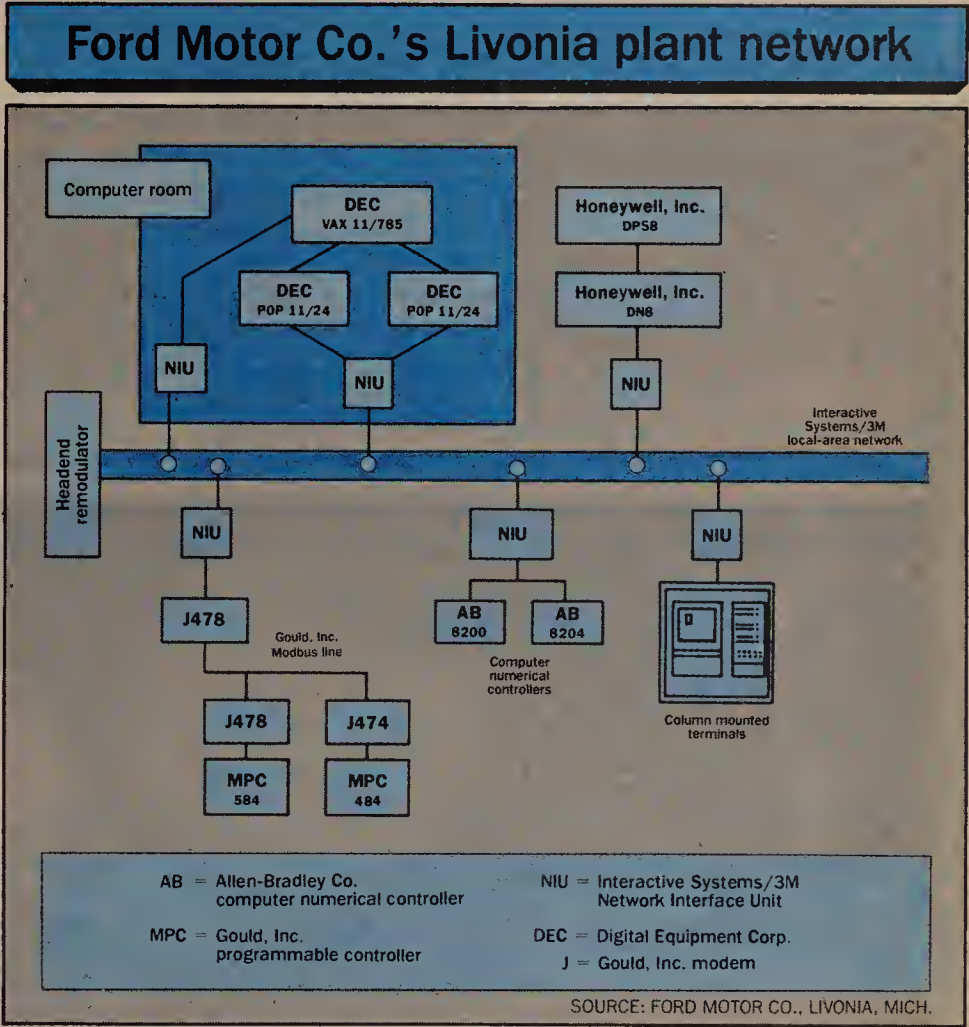
The eight-mile, token-passing bus network will eliminate manual loading of programs into a dozen materials-handling robots and a wide variety of computer numerical control devices scattered throughout the 3.2 million square-foot plant.

The program loading process, which takes an average of one hour per device

when done manually, can be completed over the local-area network in a few minutes. The breakdown of a key computer-controlled device causes the assembly line to grind to a halt until the faulty program is replaced. Such an incident can idle several hundred employees during either of the 1,600-worker shifts.

When one of the plant's 800 devices fails and requires a new operation program, a staff worker has to drag a 50-pound program loader up to a mile across the factory floor and manually load the program cassette into the

See Ford page 16



**FACTORY FACTS**  
**BOB WALLACE**

## GM ambassadors spread MAP gospel on the continent

Is General Motors Corp. aiding the enemy?

Mike Kaminski, GM's Manufacturing Automation Protocol (MAP) manager, and Chuck Gardner, chairman of the U.S. MAP/Technical and Office Protocol (TOP) Executive Committee are in Paris trying to bring several other nations up to speed on the MAP movement.

The European MAP Users Group (Emug) meeting, held last Thursday, was attended by representatives from more than 14 countries.

The meeting is designed to be an open forum for the discussion of the MAP effort and MAP concerns unique to nations other than the U.S.

GM has already allowed technical Emug committees to tie into the automaker's electronic mail network to receive the minutes from numerous MAP meetings.

The MAP movement was supposedly initiated by GM to help itself and other U.S. manufacturers compete with foreign manufacturers.

Kaminski says he and Gard-

ner will be discussing various aspects of the factory communications specification with members of foreign MAP interest and users groups.

GM's MAP manager stresses that the MAP specification — not U.S. manufacturers' applications of the standard — will be discussed at the multinational meeting.

Kaminski claims the original strategy behind MAP was to create an international standard to support communications between multivendor factory equipment.

He argues that the concerns of foreign countries must be addressed if MAP users' interests are to be consolidated worldwide. Creating an international standard will require the coordination of MAP efforts in more than a dozen nations.

Unanimous agreement on the particulars of MAP will greatly benefit GM. The automaker's ultimate systems goal is to become a worldwide, integrated industrial enterprise.

If MAP efforts abroad can be brought into line with the do-

mestic MAP movement, GM could introduce MAP technology to its European manufacturing facilities and network these plants together as part of its systems goal.

MAP is viewed by GM as a means of substantially reducing the cost incurred in networking its factories.

Several roadblocks stand between GM and its desire to become an internationally integrated entity. First, MAP officials have admitted that the foreign MAP interest and users groups lag behind their U.S. counterparts.

Second, the slower MAP technology develops outside the U.S., the longer it will take for foreign vendors to develop MAP-compliant products for use in foreign factories.

Finally, the longer it takes to create MAP factories in foreign countries, the longer it will be before GM can achieve its goal.

Orchestrating MAP technology on a continental basis should prove to be the largest and most difficult project the automaker has ever undertaken.

## INCIDENTALS

Universal Computer Applications (UCA), Southfield, Mich., currently offers both design consultation and personnel training services for individuals and firms involved in Manufacturing Automation Protocol implementations. For additional information, contact UCA at (313) 642-4792.

Architecture Technology Corp., Minneapolis, has completed a 272-page study entitled, "Distributed Process Control and Factory Communications." To obtain a copy, contact Architecture Technology at (612) 935-2035.

Control Expo '86 conference and exposition will be held May 6-8 at the O'Hare Exposition Center in Rosemont, Ill. The show will preview the latest industrial control equipment, services and technology for discrete parts manufacturing and continuous flow processing. For additional information on the show, contact Tower Conference Management Co. at (312) 668-8100.

A three-day course entitled "Integrating Robots In Assembly" will be held May 28-30 at the Holiday Inn in Dayton, Ohio. The course is cosponsored by Robotics International of the Society of Manufacturing Engineers (SME) and by SME itself. For additional information on the event, contact Maria Kisel or Lisa Juriga at (313) 271-0039. □



**Ford from page 15**  
inoperative machine. Richard Maisonneville, a member of Ford's computer-integrated manufacturing section in the plant engineering department, said when the network is fully completed, factory workers will be able to load programs into factory devices from the plant's computer room.

Workers will also be able to perform this vital task from any one of 25 Cybernex Ltd. ruggedized, column-mounted terminals scattered throughout the facility.

The 3M/Interactive Systems' LAN 1 network has already been installed. By July, all of the plant's computer-controlled devices and personal and host computers will be connected to the network.

Company officials would not reveal the pricetag of the plant's local-area network. But Ford invested \$1.2 billion in new tools and facilities to launch the 1986 front-wheel drive Ford Taurus and the Mercury Sable automobiles. Roughly \$700 million of that sum was sunk into the Livonia plant, which builds the transmissions for both vehicles, and the Lima, Mich., facility, which produces engines for the two models.

All operations programs for the company's computer-controlled devices are stored in the data base of the plant computer center's Digital Equipment Corp. VAX 11/785. The VAX, which serves as the network's archives in this application, is connected to a pair of DEC PDP

11/24s, which are in turn connected to the network via a LAN 1 interface unit.

A Honeywell, Inc. DPS 8 host, which handles administrative applications and stores parts inventory data, is also connected to the

*“By July, all  
computer-  
controlled  
devices will be  
connected.”*

broadband network. The 25 factory floor terminals are capable of emulating either a DEC VT100 terminal or a Honeywell 7801 terminal and can access both mainframes.

Maisonneville said that once the network is operational, no location in the facility will be more than 100 feet from one of the 300 taps on the network. A total of 6,000 feet of coaxial cable fan out from these 300 backbone network connections. Thirty-two proprietary factory subnetworks are connected via 3M/Interactive Systems interface units.

An average of 25 programmable controllers are connected to each of the 32 system subnets. Several transmission testing stations, controlled by a DEC PDP 11/24 and a DEC VAX 11/750, will also be tied to the backbone network.

Like many factory network users, Ford selected an outside vendor to design, install and tune the mammoth local-area network. Clover Electronics, Inc., Novi, Mich., strung over eight miles of the network's cable through the plant's rafters and decided where in the plant to locate such network hardware as signal amplifiers. Maisonneville stressed the importance of the actual network installation. “Different equipment can be connected to the network, but it is difficult to modify the network itself. Once the broadband [cable plant] has been installed, it's there forever,” he warned.

Choosing the vendor to supply the network and ancillary gear was a difficult task, Maisonneville claimed.

The 3M/Interactive Systems network was chosen over a broadband system offered by Sytek, Inc. because the 3M/Interactive Systems LAN 1 provided network interface units better geared to the factory floor, he said. Networks using carrier-sense multiple access with collision detection (CSMA/CD) were not given serious consideration because they don't perform satisfactorily in real-time applications, Maisonneville said. “CSMA/CD networks are not suited for applications requiring heavy network usage,” Maisonneville asserted.

Balancing a sizable broadband network also requires much time as well as skilled staff and a vendor with network design experience. A radio frequency signal received by any device attached to the network must be identical to the original signal transmitted from the system's head end remodulator for the system to be termed balanced.

Although the Manufacturing Automation Protocol (MAP) is the toast of the manufacturing industry, the popular user-driven factory standard movement is still in the pilot test stage and is not yet ready for prime time. Maisonneville said MAP was not a serious alternative networking strategy when the groundwork for the plant's local-area network was being laid. “We started planning for [the Livonia] installation long before MAP was anything more than a couple of ideas being kicked around. We could not afford to wait for a concept like MAP,” he explained. ■



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# COMMUNICATIONS MANAGER

## ► MANAGEMENT PROFILE

# Virginia's net watchdog

*Telecom director leads voice/data merge, fine-tunes network for the common wealth.*

As director of telecommunications for the Commonwealth of Virginia, Gene Meisner and his crew have expertly fine-tuned and optimized the state's vast telecommunications network, while pushing it into the age of voice and data integration.

Meisner's incentive for continually re-vamping the commonwealth's network is keeping one step ahead of the steamrolling tariff and rate increases that followed the divestiture of AT&T. He works with an annual budget of \$45 million. That budget does not necessarily grow each year, despite tariff increases.

Meisner's Virginia network planners have merged their three technical departments — computer services, communications and in-

formation systems — under one umbrella. Meisner recently spoke with Network World senior writer Margie Semilof on network optimization, new technologies and issues facing communications managers.

**Exactly how did you optimize your network?**

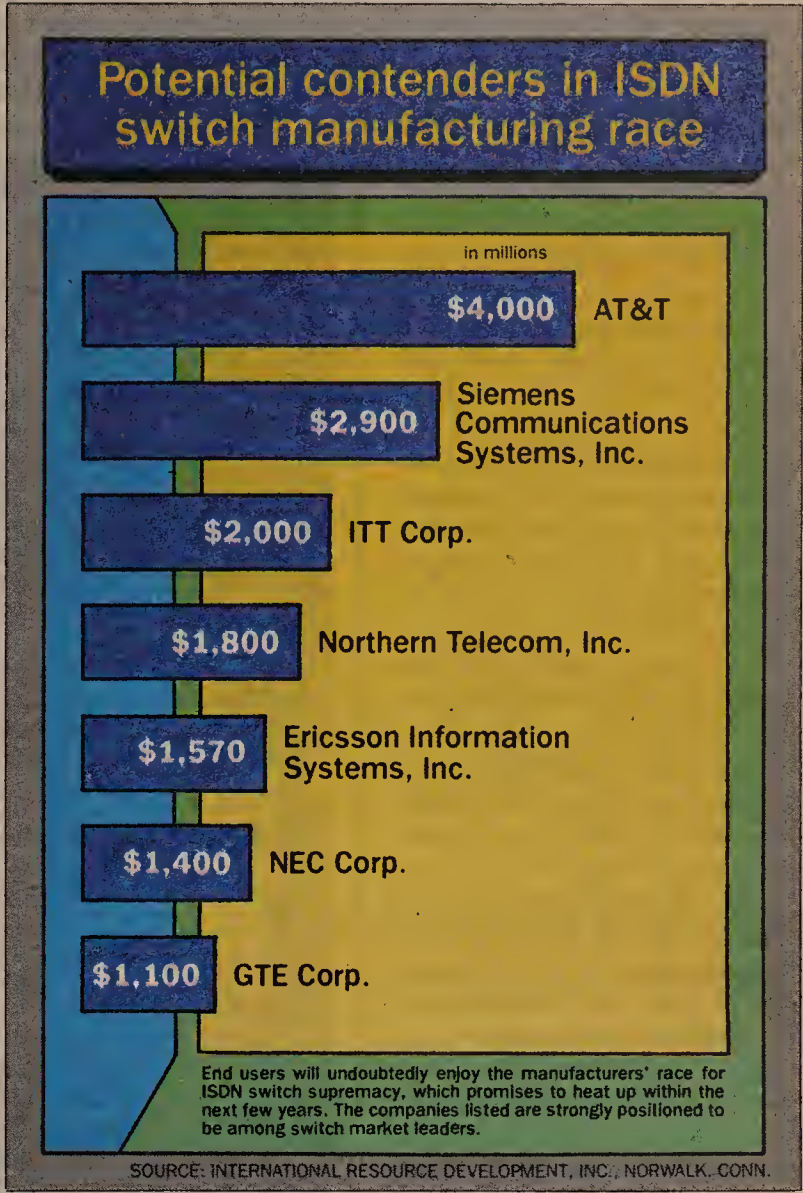
With divestiture, we were able to take advantage of new technologies like T-1 communications and new switching equipment. We are currently analyzing our voice and data circuit requirements. When we can justify the cost, we replace an old analog circuit with T-1.

Since T-1 has the equivalent of 24 56K bit/sec voice and data circuits, we can take one

See Watchdog page 18

## Salary survey

A communications manager working for a major corporation or facility with sales of \$500 million or more can expect to earn more than \$88,000 yearly. However, most managers will only earn an average salary of \$37,318, according to a recent survey conducted by Steven Langer of Abbott, Langer & Associates, a Crete, Ill.-based consulting firm.



## ► BOOK REVIEW

# Making the move to manager

BY MARGIE SEMILOF  
Senior Writer

You may have been the top researcher, network planner or general communications mandarin in your organization. You have also been recently promoted to the position of department manager and suddenly are worlds away from the responsibilities you once aced as a technical guru.

*The First-Time Manager* is a how-to book that outlines the perils of being a new boss and can help ease the uneasy manager into the new job. The skills here can be applied within any industry, so new communications managers can learn just as much from these examples as, say, a first-time bank branch manager.

Co-authors Joan Iaconetti and Patrick O'Hara have developed a pragmatic, easy-to-follow, easy-to-read (almost too simplistic) approach that will guide even the

See Move page 18

## GUIDELINES MARGIE SEMILOF

# Women and leadership

**A**mbassador Diana Lady Dougan, the Department of State's first coordinator for international and information policy, mused that some people would like to think that women, leadership and high technology are an oxymoronic combination.

Dougan delivered a breakfast address at the first annual National Alliance for Women in Communications Industries conference, entitled "Leadership '86," earlier that morning. The roster of attendees dashed anyone's belief that there were no women in communications decision-making or purchasing roles.

Despite their growing numbers, women at the show reported having a tough time finding other women who share their interest in networks, T-1 and private branch exchange systems. If those attendees were able to link up with a few new compatriots during the two-day seminar, then the trip was a success.

The conference featured mostly self-help sessions on how to succeed as a manager in an industry with a solid old-boy foundation. Not surprisingly, most of the women managers of telecommunications networks — and there weren't too many — were successful within their companies due to their own initiative and business savvy.

Even though the theme of the show was leadership, the group would serve members better by injecting a few more technical sessions.

Managers who sat in on some of the sessions reported that many issues were soft-pedaled. In fact, the panel about managing in a voice and data environment drifted onto the subject of mentoring — much to the consternation of attendees.

Despite the need for a few session modifications, the conference was valuable to anyone new to or already shoulder-deep in voice and data communications.

## PEOPLE

**Richard A. Epstein** was promoted to vice-president of research and development, and **John Kelley** was named vice-president of finance and chief financial officer of Ztel, Inc.

**Anthony Jamroz** was named to head the Fremont, Calif.-based Telco Systems Network Access Corp. Jamroz was most recently vice-president for U.S. transmission sales at Northern Telecom, Inc.

**Jan Neels** was appointed vice-president of business units of Pacific Telesis International. Neels was most recently director of international operations for U.S. Telecom, Inc.

**John T. Hartley** was elected president and chief executive officer of Harris Corp. Hartley was president and chief operating officer. He succeeds **Joseph A. Boyd**, who remains chairman of the board.

**William A. Stasiowski** was named dedicated voice mail and shared tenant services director for Wang Information Services Corp., a subsidiary of Wang Laboratories, Inc.



**Watchdog from page 17**  
channel out and use it for 56K bit/sec data. This one T-1 channel will eliminate multiple data circuits across the state.

We are also investigating the creation of a T-1 backbone that will run into areas in the state where vendors do not provide services.

The state of Virginia is deregulated, so we can save by signing contracts with vendors, rather than using tariffed services.

We saved almost \$100,000 a month on switch services by entering into a contract with the local operating company and another vendor.

**How soon will it be before technological shortcuts run out and new tariffs force you to look for new products?**

We may be able to stretch the savings until 1990. By then, we will be overtaken by additional rate increases. We may need to integrate our voice and data network or do more resource sharing.

Of course, we expect costs to increase. We just don't know to what level. Our budget will be \$45 million for the next two years, so we can maintain the same level of service we provide today.

But if nothing in the network changed, rates and tariffs would still move up. We may be able to offset those costs by another network reconfiguration, but you can only do that so many times.

**How do your statewide network needs affect all end users?**

We can push the local telephone company to replace their Centrex system with a digital system. Then the local community will be able to have immediate access to that transport technology at no additional cost.

**What is the toughest challenge facing you as a communications manager?**

Service vendors do not have the facilities in every location we require. Southernnet [Inc.] is bringing fiber optics into the state. That will be helpful in getting some of the services that other vendors cannot provide.

Fiber optics will eventually play a large role in our network. However, we cannot justify building our own fiber-optic network at this time.

It is more beneficial for us to use someone else's fiber-optic facilities for the time being.

**How do you feel about testing out new technologies?**

If there is a vendor selling a voice and data communications product that can cut cabling, improve service and save money, then we are willing to take a look.

We do testing on a small scale through the integrated technology branch of our telecommunications division. These are the people

who look down the road and try to optimize our facilities.

We are currently conducting a 90-day test of a full-motion video teleconferencing switch over fiber optics through [Chesapeake and Potomac Telephone Co. of Virginia] and AT&T Information Systems.

We have four teleconferencing locations that can be switched at 44M bit/sec. **Z**

**Move from page 17**  
most socially inept new boss through the bumpy transitional phase between life as a technician and as a group leader.

The book provides a systematic outline called the Step-up Plan that can be applied to almost any situation a manager might encounter.

Step-up, incidentally, is an acronym for: Set your

goals, tally your resources, enhance your resources, plan your action, use and abuse your plan, and plan and plan again.

The authors use real-life situations to illustrate ways of dealing with management situations that the newcomer may be facing for the first time. It alerts the new manager to available products and services  
See **Move** page 19





**Move**  
from **page 18**  
that may facili-  
tate his job and  
describes how  
best to size up  
subordinates and  
superiors.

The guide of-  
fers some reader-  
friendly advice on plan-  
ning, leading, delegating,  
diplomacy, budgeting and  
even managing stress. It in-

*“The guide also  
addresses how to fire  
employees.”*

cludes hints on tricky as-  
pects of management, such  
as how and when to social-  
ize and where and when to

wealth of information  
about basic office politick-  
ing that may be essential to  
his own survival. □

give credit.

It also address-  
es touchy sub-  
jects like how to  
fire employees.

If nothing else,  
*The First-Time  
Manager* pro-  
vides the new  
manager with a

## ► IVDW VENDORS

# Out of step?

**BY MARGIE SEMILOF**  
Senior Writer

Vendors are out of touch  
with users' needs — espe-  
cially when it comes to inte-  
grated voice and data work-

stations (IVDW), according  
to a market research study  
from the Norwalk, Conn.-  
based International Re-  
source Development, Inc.  
(IRD).

IRD researcher Peter  
Kibler said there are too  
few users of the IVDWs and  
too many vendors. Kibler  
cites a few applications,  
most notably credit and col-  
lection applications, where  
the workstations have paid  
off.

He also said that manag-  
ers who have recently  
trained their employees on  
personal computers will not  
be enthusiastic about the  
necessity of retraining  
them on more complex  
voice and data integrated  
terminals.

In addition, the study re-  
vealed that vendors are  
afraid to leave the IVDW  
market, even though they  
are frustrated by the lack  
of user interest.

Most vendors see today's  
voice and data products as  
stepping stones to using the  
workstations.

“For many vendors, to  
abdicate their positions in  
this market would be to dis-  
sipate tomorrow's market  
opportunities,” Kibler ex-  
plained.

The most significant  
players in the IVDW market  
are AT&T and IBM, each of  
which currently offers  
some form of integrated  
voice and data workstation.  
Northern Telecom, Inc. is  
also considered a strong  
market player. □

## PRODUCTS & SERVICES

# Tutorial debuts

Novell, Inc. announced a  
tutorial based on a technol-  
ogy that reportedly allows  
program screens to be re-  
corded and enhanced on a  
separate disk for use in  
training and demonstration  
software.

Software Recording is in-  
cluded with the release of  
Novell's Advanced Netware  
2.0 product.

The cost of Advanced  
Netware 286 is \$1,695. Ad-  
vanced Netware 86 sells for  
\$1,595, and Netware Bridge  
Software is priced at \$395.  
Upgrades of previous pro-  
grams start at \$195.

Novell, Inc., 748 N. 1340  
W., Orem, Utah 84057 (801)  
226-8202. □

# Souped-up Centrex.

## Hot new performance from AT&T.

Spread the word: the 1986 model Centrex from AT&T Network Systems is loaded. Now your telephone company can offer you advanced equipment options. New data communications and office automation capabilities. More customer control of features and station numbers than ever.

In all, 15 major improvements! Plus AT&T can help your telephone company customize a Centrex system to meet your special needs.

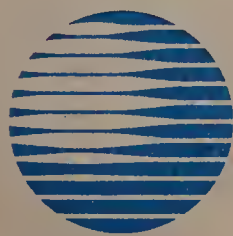
The 1986 model Centrex. Another product on the road to Universal Information Services: helping your telephone company give you any kind of voice, data or image service, conveniently and economically, over the public telephone network.

That's what makes AT&T “The right choice.”

## Featured Options

- **Customer Station Rearrangements.** Lets you change features and numbers for each telephone, saving time and money.
- **Customer Message Center.** Centralizes call answering within a business location.
- **Integrated Voice/Data Transmission.** Simultaneous voice/data transmission at up to 9.6 Kb/s, eliminating modems and separate data lines.
- **Advanced Station Message Detail Recording.** Instant access to reports on dates, times and lengths of calls made within your business location.
- **City-Wide Centrex.** Gives multi-location customers the benefits of being on a single Centrex system.
- **Facilities Management.** Allows automatic changes of Electronic Tandem Switching features from one terminal.
- **General Processing.** Office automation using the AT&T 3B computer and user-friendly management software packages.
- **Network Terminals.** New station sets with one-button access to Centrex features and programmable memories.

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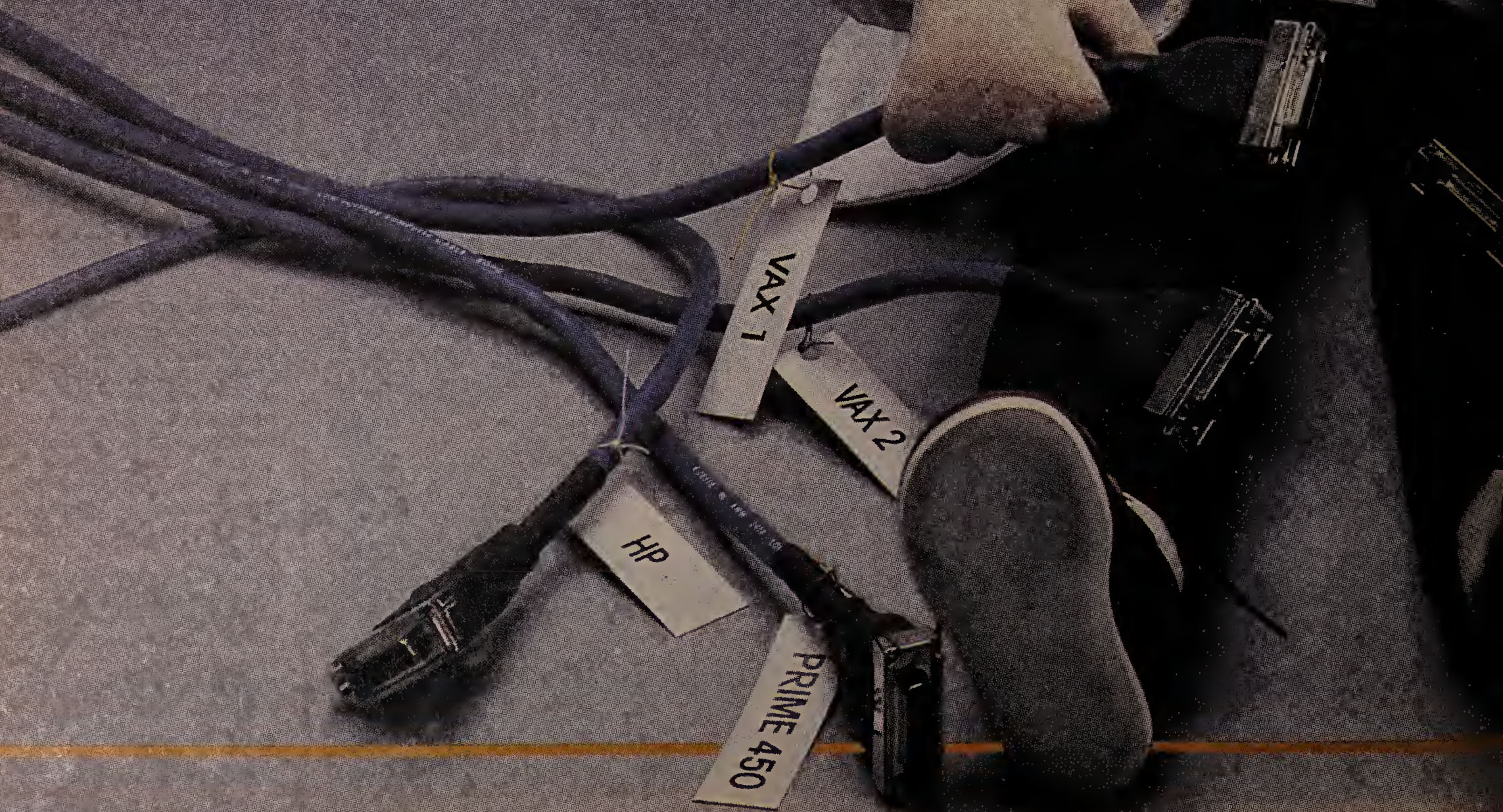


# AT&T

## The right choice.



# HAVING TROUBLE MAKING ENDS MEET?





**Y**ou say you have terminals and computers spread all over the building. There are far more users than available computer ports. You need to provide high-speed data links to remote sites. And your boss wants to know why computers and terminals can't talk over the same telephone wiring he does. Is that what's troubling you?

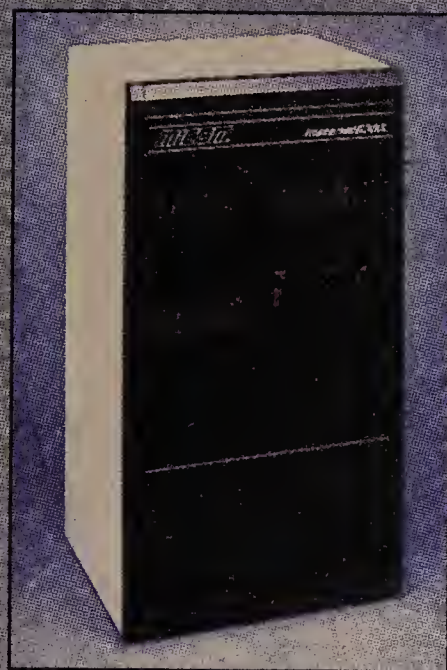
### THE DATA PABX SOLUTION

Relax. We understand these problems and have helped over 2,500 organizations of every size and description eliminate them with a solution that's as versatile as it is inexpensive: the MICOM Data PABX.

Think of it as a complete local area network in a box. A MICOM Data PABX automates the switching of terminals and personal computers amongst any number of host computers. It manages computer port contention. It functions as a fallback switch. And it lets you tie everything together by sharing the same inexpensive phone wiring that the boss, and everyone else, talks over.

Think of it as a window

into a wide area corporate information system. An extensive family of plug-in interface modules complement its switching functions with local and remote terminal multiplexing, and direct access to X.25 packet data nets, IBM 3270/SNA services and remote computer resources via leased line trunks.




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- Data rates to 19.2K bps
- Automatic log-on message forwarding
- Configuration management tools for use with IBM PC
- Space-saving cabinet
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**MODERN MANAGEMENT**

**JAMES CARLINI**

## Who rules high-tech turf?

Who runs the ship: information processing — MIS — telecommunications or office automation? This is one of the least-popular questions among today's high-technology professionals. No one wants to discuss it because it doesn't deal with technology. Rather, it deals with high-tech "turf." Managers don't want to lose any control over empires they have built during the last 10 or 20 years.

Who runs the ship? The question must be answered in every organization where information processing and telecommunications staffs make strategic decisions about the application of technology. Everyone likes to talk about implementing new technologies and merging voice with data. But they stop talking when it comes to merging departments or positions that involve the strategic triad of information technology: information processing, telecommunications and office automation.

New integrated network service offerings, coupled with the emergence of equipment that blends voice and data functions, have forced the issue. Organizations must take a fresh look at the management structure that oversees their information and communications functions. Just as technology becomes obsolete, so do the organizations that manage it.

What is the driving force in an organization? In some cases, it's telecommunications; in many others, it's information processing. Reorganizing several divisions into one integrated information systems area is no easy task. After reorganizing the information processing area, Tim Thompson, vice-president of information services at Leo Burnett U.S.A., stated, "To reorganize just one of these areas is a monumental task, let alone to try to combine management over voice and data. We are trying to optimize each area separately before attempting to even contemplate a major information-processing and telecommunications restructuring."

At First National Bank of Chicago, Assistant Vice-President Ken Jankowski explained, "Many industries are going through major management reorganizations, including the banking industry. But before we can approach integration of [the] management of technology, we must find out exactly where the general structure of management is headed."

As organizations reshape their management structures, titles for the new executives in charge of information processing, telecommunications and other technology-related departments will be the vice-president of technology, vice-president of integrated information systems and chief information officer.

He who has the wheel sets the direction. The diversity of skills needed at the corporate technological helm is more complex than traditional MIS and telecommunications positions of years past. The ideal helmsman should possess a mix of information processing and telecommunications skills, as well as managerial skills that focus on the organization's strategic business direction. Knowing how to apply the right

See **Management** page 34

*Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill.*

# PRO:

*Companies constructing metropolitan-area networks can use existing CATV broadband coaxial cables or telephone company lines. But using CATV coaxial cables is complicated at best, and the telephone companies' higher speed fiber-optic trunks are increasing in speed and bandwidth. The "pro" argument:*



## Fiber vs. broadband

**BY JAMES F. MOLLENAUER**

*Special to Network World*

After working for two years on broadband cable television-based standards, the Institute of Electrical and Electronics Engineers, Inc.'s 802 group on metropolitan-area networks has turned its attention to fiber optics.

The reason for the switch was not wholly technical. To produce a usable standard is a major undertaking that requires considerable time and effort by companies interested in building the standardized equipment. Such companies were not forthcoming in the CATV area.

With a few exceptions, CATV operators' interest has been minimal. Consciousness of the revenue potential of data communications has been lacking in the CATV industry despite market saturation for movie channels and increased competition from videocassette recorders.

Although cable has the advantage of low-cost connections for data rates of one megabit or less and is widely installed in residential neighborhoods, the CATV industry's experiments with consumer-oriented data networks have not had encouraging results. Evidently, services need to be developed in other sectors first.

The services that the 802.6 metropolitan-area network committee envisions include local-area network interconnection, bulk data (file and tape copy), interactive terminal service, digital voice and compressed video. Interconnection of multiple facilities of a corporation within a metropolitan area is the highest priority application. The bulk of the bits in such applications represent digitized voice, which requires fixed bandwidth and low delays.

Local-area network interconnection is subject

*Mollenauer is chairman of the IEEE 802.6 metropolitan-area network committee.*

to bursts of data, while bulk data is indifferent to bursts and delays. To handle this mix of traffic, backbone network speeds should be in the tens of megabits; future requirements will be even higher. In constructing networks that will span cities and suburbs, privately installed cables are not the answer. Metro-area networks must run on the CATV operator's cables or the telephone company's cables. If the CATV companies do not respond, then the telephone companies will, using fiber-optic trunking that is now being widely installed.

Another issue is the geographic coverage of the systems. CATV franchises have been the responsibility of local governments. As a result, most core cities and their suburbs are divided into perhaps a dozen different franchises operated by many different corporations. To move data freely over such a balkanized territory would require internetwork connections, as well as extensive contractual agreements between the many operators.

The telephone system, on the other hand, has a continuous network that ignores local boundaries. Although the breakup of the Bell System has complicated the telephone network on the national scale, the system continues to function as a whole on the metropolitan scale. Likewise, the historic commitment to customer service in the telephone system continues to apply. No such commitment has existed in the CATV industry. As a result, many companies would be loath to entrust their voice and data communications to the local CATV operator.

There are several technical arguments that favor fiber optics. The most significant from the point of view of constructing metropolitan-area networks is that the network's bandwidth can be much higher at today's level of technology. Most proposals for data on broadband assume

See **Pro** page 34



While fiber is the more glamorous technology for data transmission, broadband coaxial cable is the workhorse. It is easy to overlook coaxial's flexibility and lower cost, which often make it the better alternative for metropolitan-area networks. The "con" argument:

# CON:



MIKE PAQUETTE

## TECHNOLOGY

WALTER ULRICH

## Toward one network

The corporate communications network is as important to a business as the air traffic control system is to air transportation. In both cases, the needs are complex, the technology is changing and traffic patterns are dynamic. The pressure is great, and even a small error or slight miscalculation can have disastrous consequences.

A manager of the nation's air traffic control system has a carefully organized hierarchy of responsibilities. The communications manager is not so lucky. He faces a dynamic situation requiring the distribution of information within a facility, through a city, across the country and around the world.

How many networks are there? On a geographic basis, there are three: the local-area network, the metropolitan-area network and the wide-area network. A local-area network distributes information throughout a building or facility. The network manager is responsible for the distribution of information everywhere within the local network. Local network stations seem plentiful today compared with five years ago, but they are few compared with the number that will be in use five years from now.

The metropolitan area network connects facilities that are physically separated. The technologies necessary to communicate with a building across a public street are often quite different from the technologies used to communicate across a parking lot that is under a company's control.

Wide-area networks handle long-distance communications. Some companies build private networks to exchange traffic across the country between high-volume locations and use public networks to access locations where there is only an occasional need to communicate. International communications represent a special kind of wide-area network. Foreign Postal Telephone and Telegraph authorities have created a whole new set of political, technical and economic issues.

Of course, networks can be divided up in other ways. There are voice networks and data networks. Many companies also have facsimile networks or electronic mail systems. Still others have video networks. Networks can also be categorized by the kinds of transmission media they use. There are satellite networks and terrestrial networks. Some traffic is transmitted over cable, some over fiber and some over microwave.

Most companies have many networks. Different departments in the same building each have their own systems that meet their special needs.

In one building, it is not uncommon to see local-area nets based on private branch exchange technology, IBM multidrop lines, IEEE 805 coaxial cable systems and specialized personal computer networks. Some of these systems connect to other systems — down the street, across the country and around the world.

### Mission of the communications manager

The role of the corporate communications network is to accept data and information at its source and communicate it to its destination. It must serve the communications

See **Networking** page 34

Ulrich is president of Walter E. Ulrich Consulting, Inc., Houston.

## in metro net arena

BY RICHARD L. BARNES

Special to Network World

For a network to meet the needs of its users successfully, choosing communications media is just as important as choosing computers, terminals and other data communications equipment. As with most communications networking problems, the applications a network user requires determine the choice of media.

For many applications in a metropolitan environment, coaxial cable is more efficient than fiber-optic cable. A careful look at some aspects of coaxial vs. fiber-optic cable shows that the apparent advantages of fiber can be misleading.

### Bandwidth

Broadband coaxial communications provides a network designer with the flexibility to provide a wide range of services efficiently and reliably.

When compared with fiber optics' wide bandwidth and high transmission speeds, broadband seems limited. Due to the high frequency of light, the available bandwidth of fiber-optic communications is quite high, although current fiber-optic technology limits the useful bandwidth to approximately 2 GHz.

A broadband coaxial cable network typically delivers a bandwidth of 500 MHz. This is more than enough bandwidth to support most current and future communications networking requirements. In a properly designed broadband system, you can network two CPUs, five remote private branch exchanges, 20 computer-aided design/computer-aided manufacturing (CAD/CAM) terminals, 60 data terminals, one video surveillance system and three teleconferencing

sites, while still using only 16% of the total bandwidth available on the cable. This configuration is more than enough to serve most metropolitan communications needs.

Due to broadband's use of frequency division multiplexing, the digital voice, low- and high-speed data and analog video capacity for simultaneous services is great. For example, the addition of a T-1 service (24 voice channels) consumes less than 2% of a broadband network's capacity without disturbing existing services or requiring equipment reconfiguration.

Alternately, the most practical way to combine multiple services on fiber is by time-division multiplexing. This is both expensive and difficult. Imagine a fiber network with a couple of video channels, a 3274 cluster controller with a dozen 3270 terminals, a Manufacturing Automation Protocol cell controller with six robots, two PBXs and a CAD/CAM link. Assuming you make a time-division multiplexing network that can accommodate them all without introducing timing problems for your data protocols or degrading your video, you then would have to modify everything if somebody decides to add a few telephone sets. A coaxial cable-based network, in contrast, can add or delete services with readily available broadband modems.

### Transmission efficiency

In terms of signal loss per distance unit, broadband again seems to be at a disadvantage. Yet it pays to look a little closer at applications. Most users install local-area networks or metropolitan-area networks as a flexible alternative to point-to-point wiring. This allows moving devices easily, adding new devices and replacing or upgrading old devices with existing cabling. A user can install a coaxial cable network with spare taps and couplers. One piece of

See **Con** page 34

Barnes is a staff engineer with Scientific-Atlanta, Inc. in Atlanta.

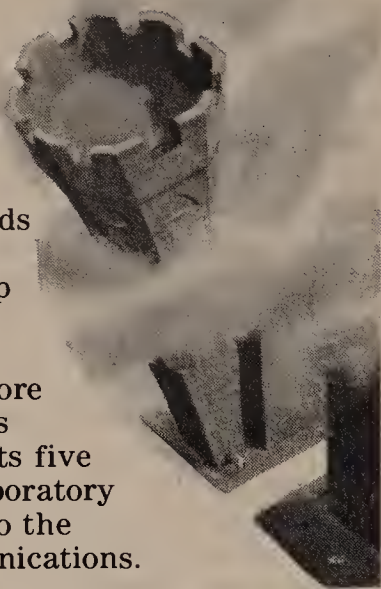


# Features

April 21, 1986

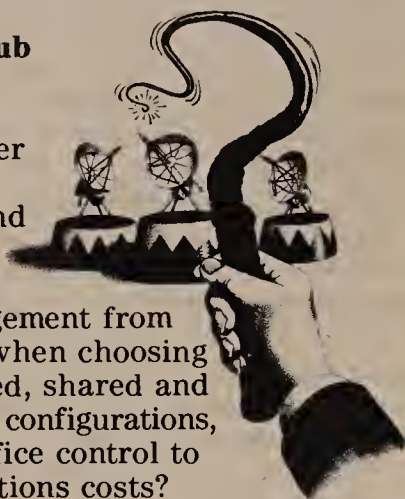
## A down-to-earth ivory tower

Developing industry standards and innovative technologies keep researchers hopping at Bellcore. With more than 200 projects in the works in its five divisions, the laboratory offers a peek into the future of communications. **This page.**



## Who should control Vsat hub costs?

Vsat network users can bolster their systems' performance and reliability if they include network management from the start. But when choosing among dedicated, shared and virtual network configurations, will they sacrifice control to cut communications costs? **Page 1.**



## No longer a bit player

Data switches are getting noticed by managers constructing communications networks. And future roles in synchronous transmissions will make a good performance even better. **Page 29.**

## ► RESEARCH AND DEVELOPMENT

# A down-to-earth ivory tower serves seven masters

*Bellcore has its hands full. Besides brainstorming for its BOC masters, it must mediate among them in its role as R&D diplomat.*

**BY MARGIE SEMILOF**  
Senior Writer

There is no better place to preview communications technology than deep in the heart of a Bell Communications Research, Inc. (Bellcore) laboratory.

It's there that the seven regional Bell operating companies brainstorm the bulk of their North American standards efforts and build an integrated services digital network plan that they hope will catch on in the communications industry.

Despite Bellcore's strong influence on Bell operating companies' products and services, most users are unfamiliar with the facility. Bellcore officials say they suppose that the name "Bell" causes confusion and prompts the public to recall the more famous research house, AT&T Bell Laboratories.

Actually, the two-year-old Bellcore is a creation of the Modified Final Judgment of 1982, the legal document that provided the framework for the breakup of the Bell system. Bellcore solely serves the RBOCs, which lost the vast resources of Bell Labs to AT&T in 1984. Most of Bellcore's technical talent was hand-picked from Bell Labs during the organizational phases of Bellcore's development. The facility's staff now numbers 7,500 in six locations spread out over northern New Jersey.

Rather than create seven new research arms for the BOCs, Bellcore was formed to tie together each operating company's research efforts. It operates as an independent contractor that is signed to produce a list of deliverables to its seven masters.

Bellcore's research is focused on products and services that operate to serve the local exchange — unlike Bell Labs, which directs its research exclusively toward the long-distance network, computers and the other kinds of business

equipment AT&T Technologies, Inc. produces. This distinction eliminates much of the competition between the two houses, although they may still compete for awards and government contracts.

The facility's beefy budget of nearly \$1 billion is voted by the RBOCs and is spent developing specifications for a variety of projects and services that will be used all or in part by most of the RBOCs. The individual BOCs are under their own financial plans and have different product and service interests. Therefore, the amount each will spend on any given effort varies.

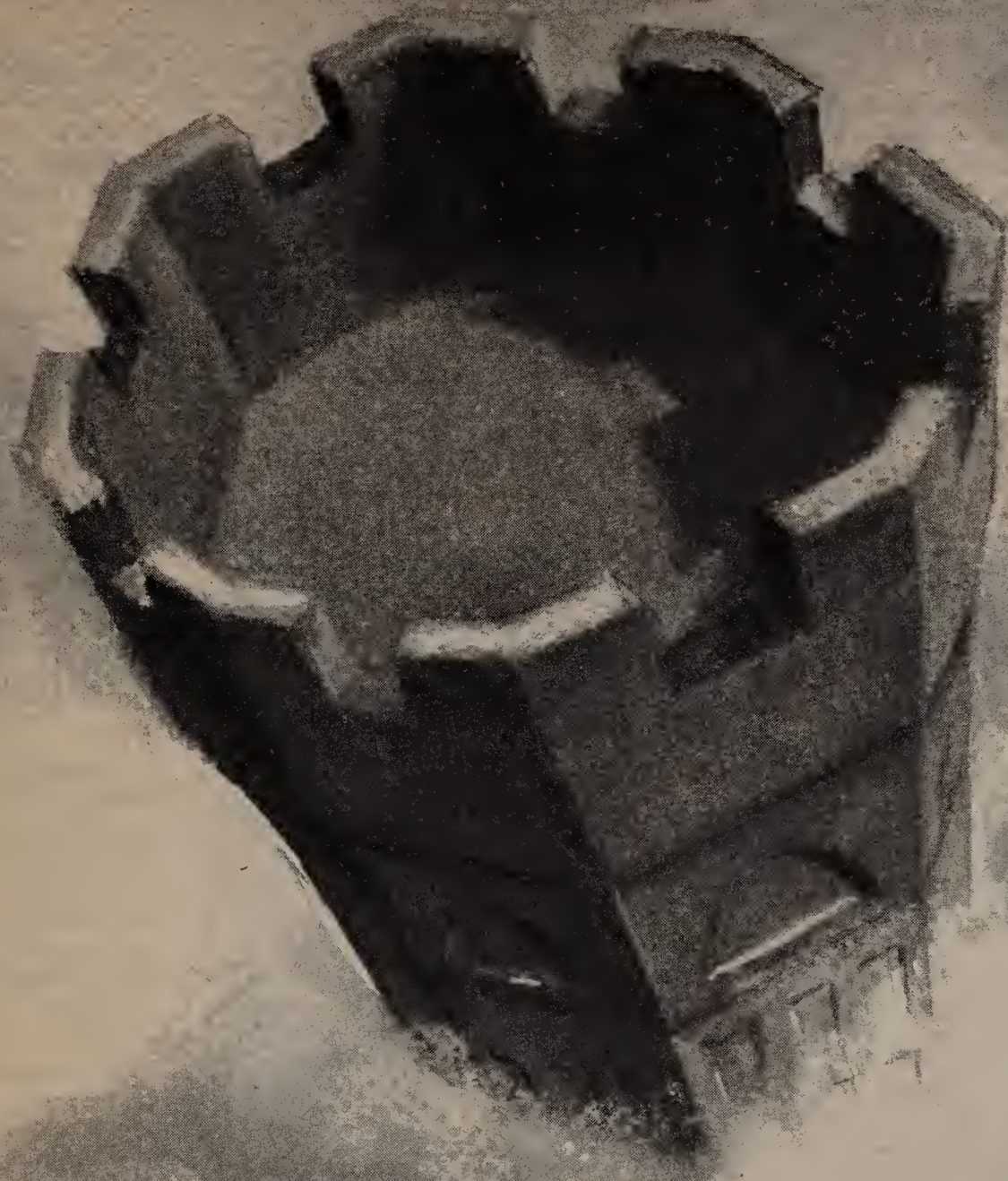
Projects are defined as either core or special. An example of a core project is the development of a standard, in which case the RBOCs vote to support the endeavor. Bellcore publishes the results with the intention of gaining industrywide acceptance of the work. At least five of the seven RBOCs must agree to a project to make it core.

Special projects may be contracted by one RBOC and may be as specific as the development of a software tape. There are approximately 236 projects under way right now. About one-third of those are core projects that will eventually fit into Bellcore's overall network planning strategy. Those experiments fall into three categories that constitute the backbone of Bellcore's network building strategy.

The first Bellcore experiment is defining an architecture and laying out protocols for ISDN. Additional research is carried on simultaneously to define services that will eventually run over that architecture and define the level of technical support that users will receive.

Another Bellcore priority is developing customized calling services for individual users by controlling an intelligent network from a centralized data base. Eventually, a switch will be able to gather a wealth of precise information,





such as the caller's location, rather than simply signaling to the recipient that there is an incoming call.


A third endeavor is combining voice, data and video in metropolitan-area networks. This is being tested in several cities by companies with huge intracity data transmission needs. Of course, the greatest challenge to any Bellcore project is the acceptance of the institution's recommended generic standard. Bellcore must not only convince each region to implement its in-house lab specifications, but it must also attempt to generate wide appeal among other vendors.

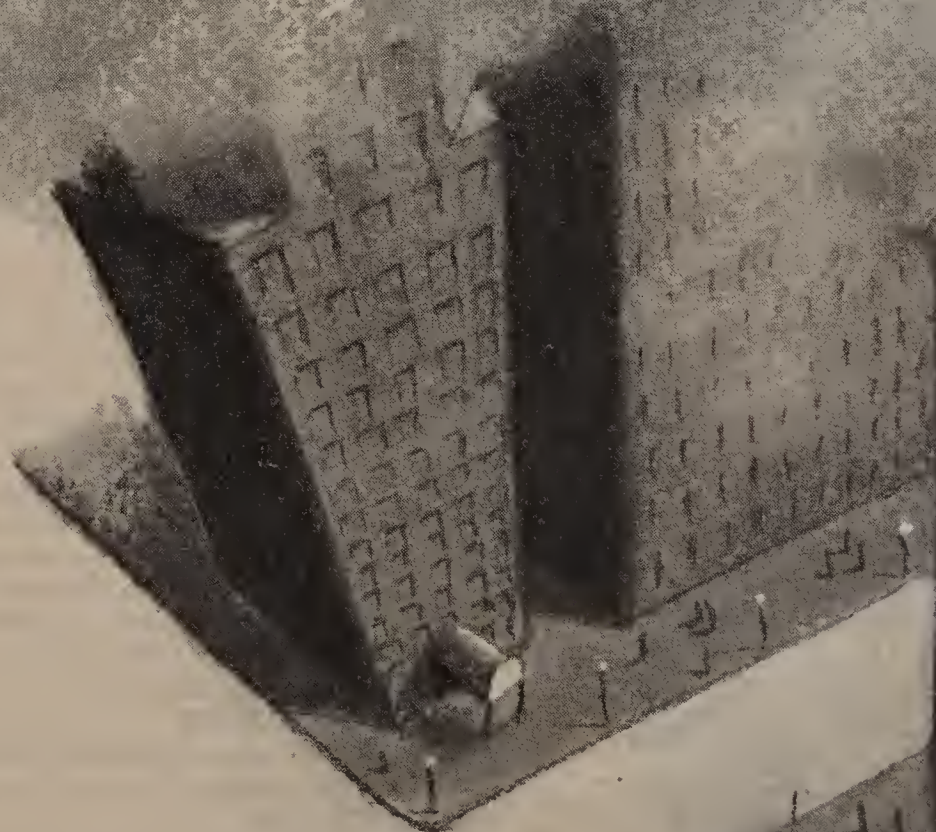
The facility works closely with a number of standards-making bodies, including the International Standards Organization, the Institute of Electrical and Electronics Engineers, Inc. and the recently created Corporation for Open Systems. It is also active on many standards committees within users groups such as the International Communications Association.

According to Gary Handler, vice-president of network planning, to coordinate a cohesive standards effort, the staff engineers operate as independent contributors and make their best technical judgments before reviewing them with the individual companies.

"Standards are a negotiating process," Handler says. "The BOCs don't have to support our recommendations, but it is in their best interest to do so. National customers wouldn't be too happy if standards changed from one operating company to another."

Bellcore maintains that widespread acceptance of general standards will speed along the transition to an ISDN environment. Handler explained that BOCs rarely run off to complete projects on their own. When they do, the issue usually involves a solution to a customer's immediate need, such as pre-ISDN services.

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Continued from page 25

The fact that most BOCs have announced ISDN trials to begin imminently is evidence that these local vendors are not willing to wait for final ISDN specifications from Bellcore. They claim that customers are clamoring for the service now, and vendors are unwilling to miss that opportunity. One spokesman from BellSouth Corp. remarked that the only thing his company can do to avoid a clash with the final ISDN specification from Bellcore is to try to limit the deployment of equipment that may be suspect to any major inconsistency.

Handler, however, is unsure of whether the BOC's ISDN product expediency will be beneficial to end users in the long term. "If we are

going to have a short-term [ISDN] need with a lower speed requirement, then maybe we need a transition period between pre-ISDN and ISDN architecture," says Handler.

But even if a local operating company accepts a generic standard, those specifications are often molded to meet the BOC vendor's specific equipment blueprints.

Brian Breedlove, director of network architecture for Ameritech Services, Inc., lauds Bellcore as a technical resource. But he adds that the RBOCs face the task of figuring out how to coordinate their own efforts, Bellcore's work and the work of other standards bodies.

"There is a lot of value in Bellcore's work," he said. "The RBOCs must learn to use it effectively." ■

## ► BELLCORE DIVISIONS

# Ideas taking root

The Bell Communications Research, Inc. (Bellcore) laboratory is split up into five divisions that accommodate its diverse work load.

The network planning division is one of the five. This sector spearheads the standards-making efforts and implements network tools that will be in Bell operating company networks shortly.

There is also an applied research group that explores BOC technology needs. The unit delves into subjects like artificial intelligence, speech synthesis and real-time

wideband video switching. The network planning group's research is slated to be implemented in BOC networks in two to five years, while applied research takes place five to 10 years in advance of actual implementation. If a project within the network planning division fails, the applied research group can switch its long-term planning direction.

The technology systems division develops technical guidelines and provides a quality assurance service that tests vendor equipment for its acceptability into the existing BOC network.

Another Bellcore division is solely concerned with software technology development. Much of that work is dedicated to improving existing systems already in place within the BOCs' networks. The technology applications group provides day-to-day support for existing BOC procedures.

Not all of Bellcore's research is scientifically oriented, however. The facility conducts its own market research to find out what users like or don't like about particular services. Researchers' ideas are evaluated and proposed to the BOCs before any major undertaking occurs. The BOCs may then undergo some of their own specific marketing research before they decide to invest in a project.

Most of the work coming from Bellcore's network planning department is expected to appear within regional BOC networks in two to five years. Other research departments depend wholly on the results of network planning and the willingness of users to adopt the idea. More futuristic projects may be implemented in five to 10 years.

One of the more ambitious research projects involves building wideband networks using LED or fiber optics as a transmission medium. According to Fred Andrews, vice-president of technology systems, high cost has been the biggest barrier to the success of many technologies, including wideband networking.

"Anyone can put gigabits onto fiber," he said. "Affordability is the problem. In the past, everyone has been using lasers. If we could do it with LED, maybe we could bring the cost down."

Andrews noted that other research projects are concerned with improving fiber-optic technology, semiconductor material and video coding. Part of his job, he says, is to watch for trends in technology.

The people at Bellcore don't want to react to market demands, he says. "We want to be out ahead."

Andrews says that one example of following a developing trend is watching as the demand for digital technology emerges and users learn what they can accomplish using fiber optics. ■

— Margie Semilof

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► CONTINUED FROM PAGE ONE

# Who should control Vsat hub costs?

*Once an afterthought, Vsat net management now demands forethought. Customers have several options for control.*



TOM BARRETT

those of terrestrial networks. Satellite systems attempt to provide much higher network availability than their terrestrial counterparts.

Indeed, some implementations approach nonstop availability. In addition, building in network management and making it an important part of the system offers better operational and support capabilities.

Deciding who should own and operate the master station, or the hub, of the network is critical. The hub is essential to the network; it is the center of operations and management. It consists of a large-diameter antenna, approximately nine meters wide, which is designed to provide extremely reliable interconnection between remote terminals and the host computer system.

A fully redundant radio frequency subsystem is included within the hub. In addition, a hub switching system is responsible for concentrating and multiplexing network functions. These functions establish and maintain virtual circuits connecting ports on the host computer with terminal equipment attached to remote communications stations.

The hub is the critical control point for the entire network, and the customer should have control of it. The radio frequency subsystem has an automatic

switchover capability that operates on a one-to-one hot standby configuration. Because of the hub's fault-tolerant architecture, the network can switch from a failed unit to a hot standby unit with no interruption and can maintain data for some time before signaling trouble in the network.

Within the network, the hub is the single most expensive portion. A great deal of money can be saved by using a vendor-operated shared facility that enables the user to split the cost of the hub and a major satellite transponder channel with other network customers. This approach, however, has its price, and that is the loss of direct control of the network.

One component in the hub station is the network control computer. This device reduces the complexity of central switching and provides customers with information about network performance. The network control computer is also fault-tolerant because the network management capability must be highly reliable in providing uninterrupted service and dispatching the appropriate remedy if a problem arises. It reduces network costs while preserving the capability to control and optimize network operations.

With the proper network management facilities built into the network, a virtual private network may be implemented with the vendor operating the hub and with users operating their own networks via a remote network management control console.

Continued on page 28

*Stratigos is director of digital and software engineering for Tridom Corp. in Marietta, Ga.*



From page 27

The best way to understand these differences is to look at a typical satellite network implementation and examine the alternate hub configurations and network management capabilities that these control facilities provide.

Integrated system architecture

Integrated system architecture interconnects and manages very small aperture terminal (Vsat) communications stations that are located at the remote office.

The communications stations connect a range of terminals and remote controllers to the hub via dedicated 512K bit/sec outbound channels and multiple 32K bit/sec inbound channels.

These components form a complete end-to-end transmission and distribution facility. High-speed terrestrial or satellite channels that connect to the hub station connect the net facility to the customer's host or front-end processor. The host interface unit, which is located on the customer's premises, is a key element in the partitioning and controlling of this interface.

The processor performs protocol translation and formats data to be transmitted over assigned 32K bit/sec channels. It also performs monitor, control and diagnostic services for the communications station. The station communicates with the hub station through a small aper-

ture antenna that is mounted separately on the rooftop.

Transmission services are provided via a high-power, Ku-band satellite. Ku-band operation provides better performance and minimal terrestrial interference. The services are divided into outbound channels from the hub to remote stations, and inbound channels from remote stations to the hub.

When inbound channels are shared, a multiaccess protocol provides low-cost mutual transmission on a common channel with a minimum of hardware. This protocol maintains low delays for transaction-processing applications and permits efficient sharing of inbound channels.

The network control computer is the final portion of the hub station. It continuously monitors and displays the status of the network, gathering data to reconfigure and operate it. The software connects transparently to the customer's front-end processor without any modification.

Hub station alternatives

The network may be implemented modularly to provide three different customer ownership and control alternatives:

■ **Dedicated private network.** The customer owns the hub station and keeps it on the premises. All network facilities, including a dedicated 512K bit/sec satellite transpon-

der channel, are used exclusively for the private network.

The customer has full control of the network, including the remote communications stations. Should any of the remotes fail, the customer can call directly for service. These networks use a full 512K bit/sec satellite transponder channel, whether or not the network needs that much capacity, because the channel cannot be divided among multiple users unless they share the same antenna and network multiplexing equipment.

■ **Shared private network.** The vendor operates the entire system for the customer. The hub station is owned by the vendor who uses it to support multiple customer private networks via the one facility. The satellite transponder 512K bit/sec outbound communications channels can be shared with other customers with light data traffic requirements who otherwise could not afford a dedicated channel.

The vendor monitors the remote communications stations and notifies the customer's maintenance organization when problems occur.

■ **Virtual private network.** The customer operates the network that runs on a vendor-owned hub station, which means lower user costs. The customer can share 512K bit/sec outbound satellite transponder channels with other networks if traffic requirements are light.

The network control console and other control mechanisms for the network are located on the customer's premises. By partitioning the network in this manner, the customer performs routine reconfigurations, diagnostics and maintenance functions.

The vendor operates shared facilities and functions. The customer can obtain equal levels of control through dedicated or virtual networks. The vendor, however, will retain control of the satellite transponder operation for each alternative.

Adding extra satellite transponder capacity to a dedicated network is difficult and expensive because it can only be done in 512K bit/sec increments. Generally, growth with virtual network operation is easier. It comes in smaller increments and at a much lower cost because the customer shares a pool of channels and other equipment at the vendor's facility. Network service is a virtual circuit ser-

vice from the customer's host computer equipment to the terminal equipment. The service is transparent to the customer; it appears to the terminals as a host.

With network service, customers control traffic parameters and assign communications stations to one or more inbound 32K bit/sec channels. They can also measure traffic and reassign critical locations that demand faster response times to lightly loaded channels and load up locations where response time is not as critical.

The characteristics of network service are superior reliability, improved network throughput, a longer fixed propagation delay and an integrated set of network management services that permit customers to operate and reconfigure the network.

Of course, there is the possibility that the customer will say, "Look, I've gotten myself in trouble. I've reconfigured something, and I don't know what I've done."

In that case, the network operator would look at the configuration and make modifications as required to get the customer back on the air. The operator can also watch the customer alter the configuration and stop the changes ahead of time, saying, "Are you sure you want to do this?"

The menu-driven software prevents unauthorized changes to the data.

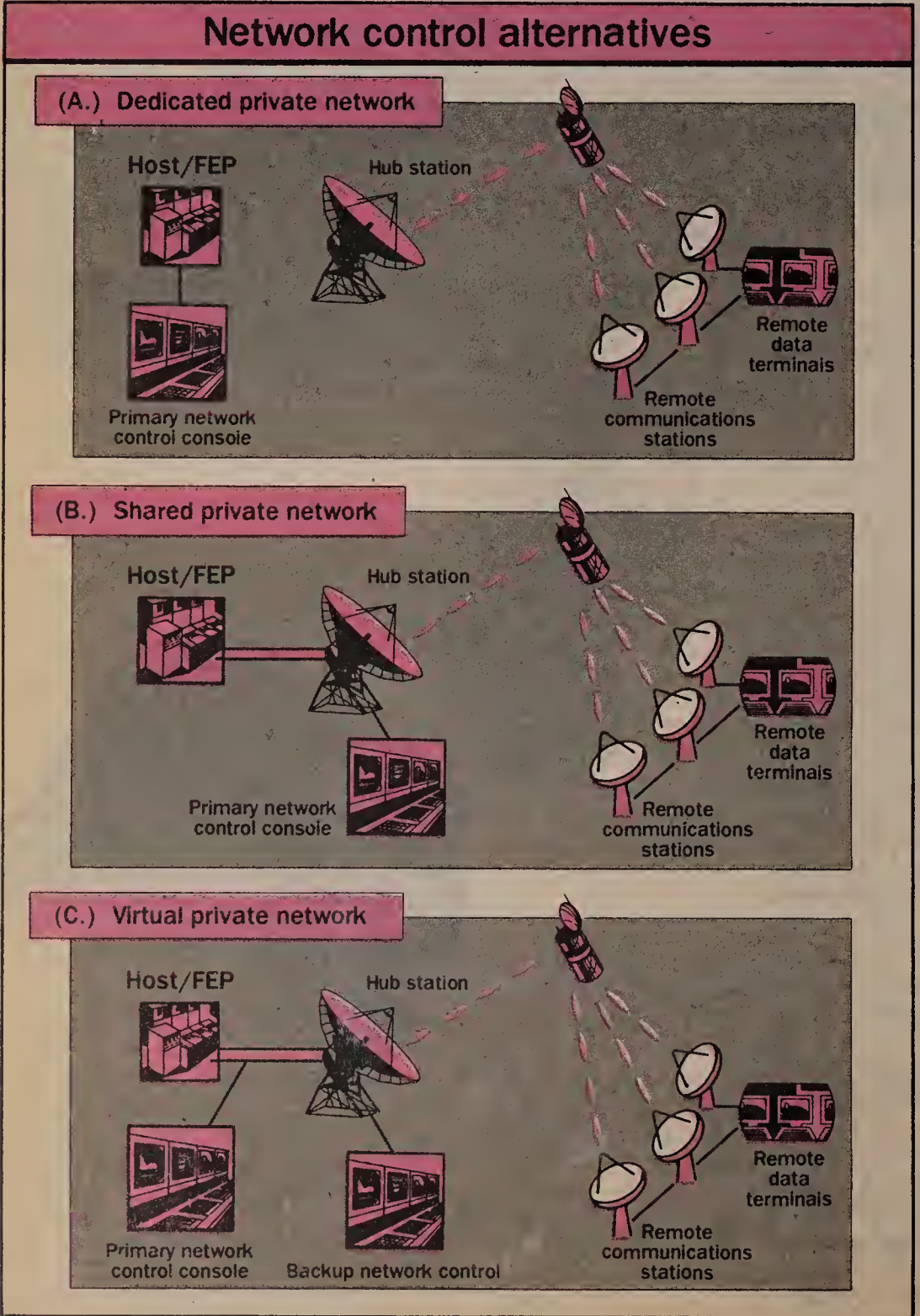
A less complex solution to the operator problem is also available through these facilities.

Remote terminal in monitor mode

The customer can choose to use a remote terminal only in the monitor mode and can direct the net operators to implement the changes. Customers can tell at a glance which nodes are on the air, which nodes are having problems and which nodes are operating normally. The screens that present this data are designed to be easy to use and understand.

For example, color highlights critical information to call attention to it immediately.

Vsat networks designed with network management in mind provide superior system availability. And the virtual private network approach to hub station operation and management can cut costs and improve operations for the private network customer. □

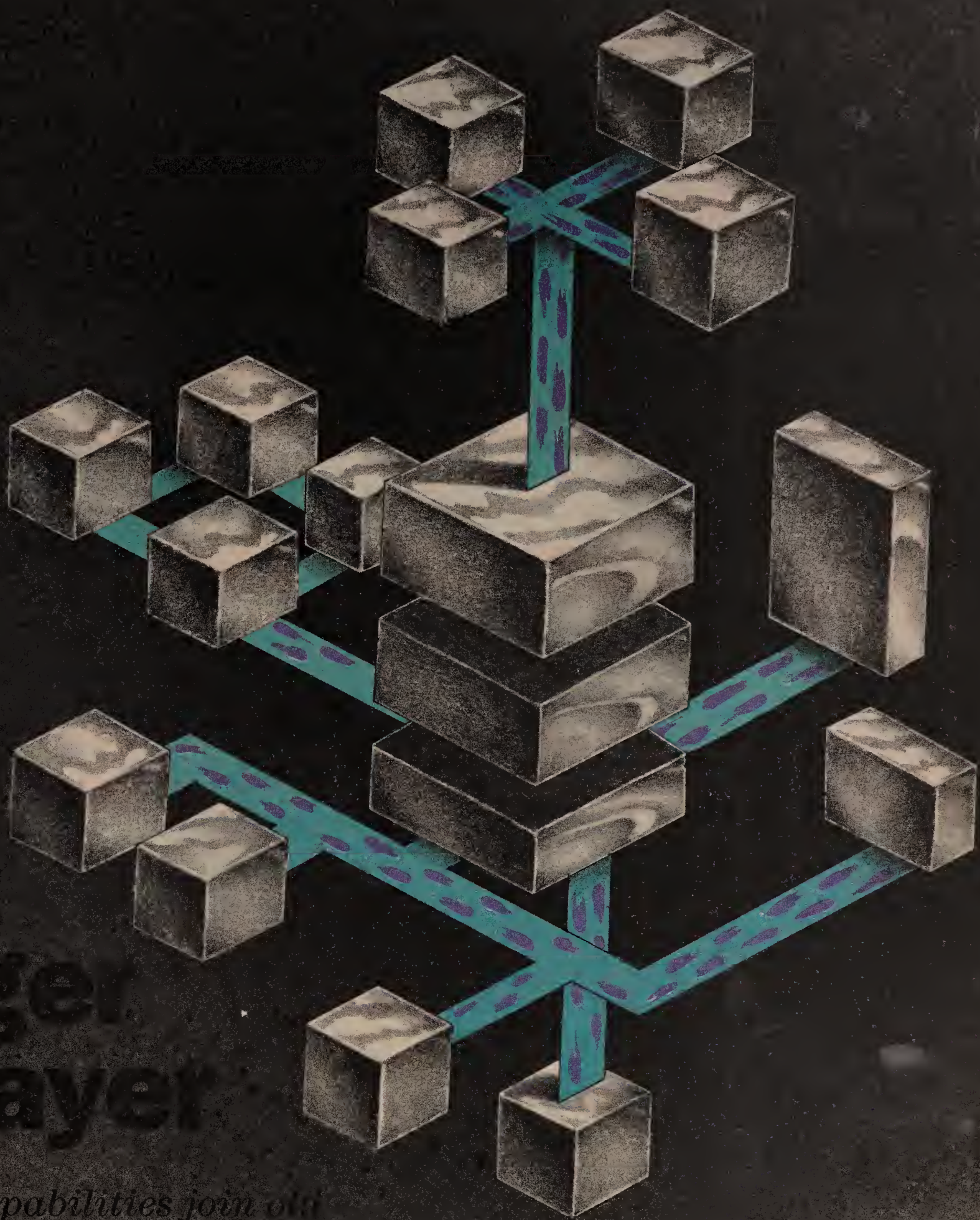


SOURCE: COMMUNICATION STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

Network operation alternatives			
	Dedicated private network, customer operated	Shared private network, customer operated	Virtual private network, customer operated
Master station ownership	Customer	Vendor	Vendor
Network control & operation	Customer	Vendor	Customer
Network performance optimization	Customer	Vendor	Customer
Remote station administration & maintenance mgmt.	Customer	Vendor	Customer
Satellite transponder monitor & mgmt.	Vendor	Vendor	Vendor
Partial transponder channel operation	No	Yes	Yes
Transponder channel expansion	Difficult	Generally easy	Generally easy

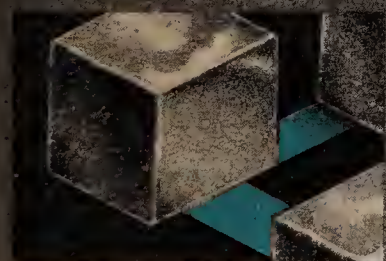
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## ► DATA SWITCHES

# No longer a bit player



*New capabilities join old standbys as data switches take a leading role in communications networks.*

**BY BOB WALLACE**  
Senior Writer

Data switches are the unsung heroes of countless companies' data communications networks. These plain-Jane devices perform the task of switching numerous terminals between multiple processing resources — and until recently, received little recognition for their efforts.

Switching asynchronous data has been the bread-and-butter business of data switches for several years. Vendors of these switches are now adding capabilities such as synchronous data transmission to their products.

Another major trend within the data switch market is support of T-carrier and fiber-optic technology. These transmission media can be used to tie multiple data switches together. The use of T-carrier and fiber-optic media to connect multiple data switches will allow network users to build systems that cover wider areas.

A few vendors have already enhanced their

switches to allow them to be connected by T-1 services — which operate at 1.544M bit/sec. M/A-Com, Inc.'s Telecommunications Division in Germantown, Md., and Infotron Systems Corp. in Cherry Hill, N.J., both offer data switches that may be tied together using the T-carrier. This feature allows data network users to construct truly wide-area networks serving sites located thousands of miles away from one another.

These innovations have resulted in a rapid increase in data switch sales.


A study prepared by the Framingham, Mass.-based International Data Corp. projects a 21.6% compound annual growth rate in U.S. data switch sales during the next three years, and sales of \$220 million in 1989.

Constructing a data communications network around a data switch is like making your own ice cream sundae. You start with the plain vanilla basics and pay extra for everything beyond that. For example, the EIA RS-232 specification

recommends a 50-foot maximum cabling distance for communications applications. Where does that leave the user who has 100 feet standing between his terminal and the company's data switch? He must purchase a line driver from the data switch vendor. This device reshapes and amplifies the digital signal so that terminals can be supported up to several thousand feet from the data switch.

Clusters of terminals located far from the switch itself can be connected to the switch with vendor-supplied packet assembler/disassemblers (PAD). Another means of conquering cabling distance limitations is to connect multiple data switches. Such a scenario would include one or more units connected to a master data switch at the central company site.

Most data switch vendors offer prospective users a wide array of add-on equipment. Users can implement line drivers, local multiplexers, protocol converters and PADs to increase the

 Continued on page 30



Company	Product	Maximum # of ports supported	Asynchronous support bit/sec	Synchronous support bit/sec	Non-blocking architecture	Maximum # switches networked	Distributed architecture	Security type	T-1 interface	Fiber optics interface	Price per port P = port
Applied Innovation, Inc. Columbus, Ohio	Alswitch Series 170	256	19.2K		✓	4		password, dialback			96P=\$160 160P=\$148 192P=\$146
Codex Corp. Mansfield, Mass.	IMS 7800	500	9.6K	64K	✓	64		password, dialback			120P=\$154 312P=\$120 500P=\$112
Develcon Electronics Ltd. Saskatoon, Sask.	Develnet Series 6000	8,000	9.6K	9.6K	✓	16	✓	password	✓	✓	200P=\$200 1,000P=\$250 8,000P=\$250
Equinox Systems, Inc. Miami, Fla.	DS-15	1,320	9.6K		✓	2	✓	password			180P=\$128 500P=\$110 1,320P=\$99
Gandalf Data, Inc. Wheeling, Ill.	PACX 2000	1,920	19.2K		✓	32	✓	password		✓	100P=\$167.50 250P=\$139.50 850P=\$126.91
Infotron Systems Corp. Cherry Hill, N.J.	INX 4400	4,000	112K	112K	✓	64	✓	password	✓	✓	\$250- \$350
M/A-Com Telecommunications, Inc. Germantown, Md.	IDX 3000	3,072	19.2K		✓	16	✓	password	✓	✓	768P=\$98 1,536P=\$115 3,056P=\$135
Metapath, Inc. Foster City, Calif.	Metapath CDS-080	80	9.6K		✓	2,812	✓	password		✓	5P=\$1440 80P=\$150 1,000P=\$95
Micom Systems, Inc. Simi Valley, Calif.	Instant 6000 Data Pabx	1,016	19.2K		✓	unlimited	✓	password	✓		100P=\$150 500P=\$107 1,000P=\$95
Sequel Data Communications, Inc. Cary, N.C.	Distributed Data Switch	192	19.2K	19.2K	✓	2		password, dialback	✓		96P=\$83 132P=\$87 192P=\$83

From **page 29**  
data switch's flexibility. Data concentrators, often referred to as super multiplexers, can be used to increase the number of terminals connected to a data switch. Protocol converters enable the data networker to connect synchronous terminals to the data switch. Gateways to IBM Systems Network Architecture and binary synchronous communications networks are also available from many data switch vendors.

By attaching a printer and a generic terminal to the data switch, the user taps into a seemingly unending source of statistics. This information can perform network analysis studies or it can alert the switch operator to an equipment failure. The lowest common denominator in data-switch network management is the time-stamped log. This report lists all terminal-to-host connections, when the units were connected, how long they were linked and which terminals were connected with which hosts.

**Security**  
All data switch vendors listed on the chart above offer some type of password protection. The switch operator simply programs the unit to connect terminals to appropriate hosts, depending on the password

*“Data concentrators can be used to increase the number of terminals connected to a data switch. Protocol converters enable the data networker to connect synchronous terminals to the data switch. Gateways to IBM Systems Network Architecture and binary synchronous communications networks are also available. By attaching a printer and a generic terminal to the data switch, the user taps into a seemingly unending source of statistics.”*

the user enters at the desktop.  
The switch operator may also set certain parameters that base access to connected computers on user groups.  
A second switch security feature is service security, which permits

the switch operator to designate which groups of users can access computers or other network resources.  
All vendors listed on the product chart offer this feature.  
Several vendors either offer or

are currently beta-testing a switch dial-back security measure intended to frustrate unauthorized users seeking access to a company's computers. Applied Innovation, Inc., of Columbus, Ohio, offers a dial-back line card that users can insert in an Alswitch's bus slot.

A remote user dialing a switch equipped with this feature reaches the switch, not a computer. After entering the number, the user hangs up the telephone, and the switch calls back if the number is valid. The user can then choose with which processing resource he wishes to connect.

**The local net interface**  
Although few data switch vendors already offer local-area network interfaces for their switches, Codex Corp. in Mansfield, Mass., offers an RS-232 link interface that allows asynchronous terminal users to access its baseband entryway local-area network. Users can also make a data switch to local net connection using additional gateway equipment available from Codex.

Many modern data switches sport distributed architectures. Gandalf Data, Inc. in Wheeling, Ill., makes the PACX 2000, which offers a modular switch unit that features such an architecture. A portion of the modular switch may



be located far from the master unit to make it more central for service to a second group of terminals at another location.

Equinox Systems, Inc. in Miami, Fla., and Infotron Systems Corp. of Cherry Hill, N. J. also offer data switches that break down into smaller pieces to fit distributed data processing applications.

M/A-Com Telecommunications Division's IDX 3000 is one of several switches that incorporate fiber-optic technology into intra-building applications.

Portions of the unit could, for example, be placed on floors one through nine of a 10-story building to service terminals on each of these floors.

The remote modules would connect to the master switch on the 10th floor using fiber-optic cable.

Other products could also be used in this type of application.

Some of these products include Infotron's INX 4400, Gandalf's PACX 2000 and the Foster City, Calif.-based Metapath, Inc.'s CDS-080.

Defining the term "nonblocking architecture" as it applies to data switches is difficult at best.

In theory, a nonblocking architecture allows all users simultaneous access to the data switch and immediately routes them to the attached computing resources.

In reality, it is extremely unlikely

that all users would want to access the switch terminal at the same time.

But based on this definition, a data switch that supports up to 500 ports could boast a nonblocking architecture only if the user configures the unit with 250 ports on each side of the device.

Because the founding concept of the data switch is its ability to connect numerous terminals to a smaller number of computers, most applications will feature a switch configured to handle far more incoming than outgoing lines.

The data switch operator, calling on reports of data produced by the switch, can determine peak utilization situations and configure ports on the unit to accommodate potentially high demand.

In this case, the switch may not be totally nonblocking, but would seem so to users, because those users working at terminals would not have to wait for switch access.

The Dublin, Ohio-based Anaconda Advanced Technology, Inc. was the site of the first installation of an Applied Innovation AIs switch Se-

ries 170. Chuck Tommey, the company's data processing manager, says the unit, which was installed in January 1984, is equipped to handle a total of 192 ports.

The AIs switch, Tommey explains,

*"In theory, a nonblocking architecture allows all users simultaneous access to the data switch. In reality, it is extremely unlikely that all users would want to access the switch terminal at the same time."*

meys explains.

"Not only does the switch save us wiring costs, it also saves us resources because we don't have to have a dedicated port on a computer for each individual."

Because the AIs switch supports an RS-232 connection, Tommey is not limited to using only DEC terminals.

After more than two years of use, Tommey says he has had no software failures and only two minor hardware failures with the AIs switch.

As the company grew, Tommey was in the position of deciding whether to add additional hardware to the DEC computers to accommodate the increased number of

connections or to bring in a data switch.

"We were increasing our employees, and with more people on the computers, we were going to have to add extra cabinets to handle [the terminal-to-computer connections]," Tommey says.

"The money we saved in not having to add this extra hardware paid for the data switch," he concludes. ▣

switches between 65 and 75 Digital Equipment Corp. terminal users and seven DEC computing resources.

All terminals as well as processing resources are within a single facility.

"Instead of running wires from each terminal to each computer, we are running one set of wires from terminals located in the engineers' offices to the data switch," Tom-

## ► AN ALASKAN TRIAD

# Big switch on campus: creating a collegiate network

The need to connect three geographically dispersed campus locations to eight large computers resulted in the creation of a three-data-switch network at the University of Alaska.

Bill Gregory, diagnostics supervisor for the university's computer network, connected some 2,000 users to three Infotron Systems Corp. INX 4400s throughout Alaska.

Two INX 4400s in Anchorage and Juneau tie to a third unit in Fairbanks via conditioned voice-grade satellite circuits obtained from Alascom, Inc.

Of the network's users, 99% are hard-wired into the multiple data switch system.

The school's Juneau campus is linked to the main campus in Fairbanks via a 19.2K bit/sec satellite link, and a 56K bit/sec link connects the Anchorage campus to Fairbanks.

The network supports a per-

user data speed of 1,200 bit/sec.

Throughout the state, the network also connects several community college locations.

the network's users access the university's four Digital Equipment Corp. VAXs, the school's academic computers.

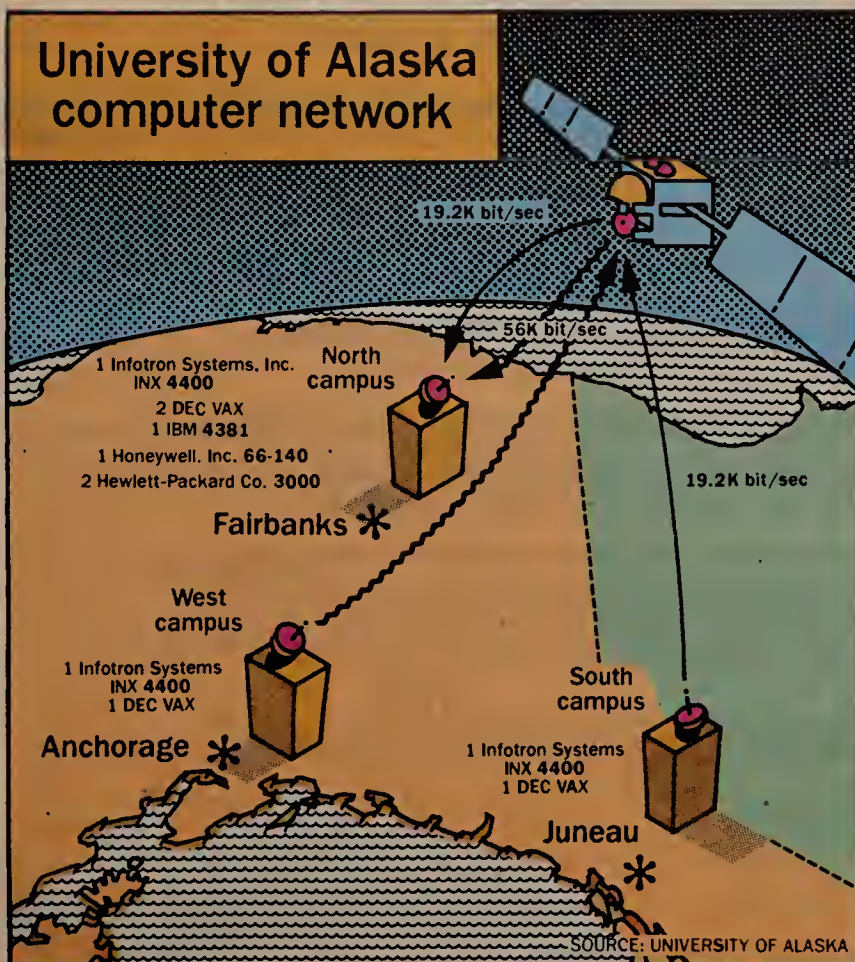
Others use the data switches to gain access to any of the four remaining computers that operate in administrative applications.

"Any user in any part of the state can access one of the eight CPUs," Gregory explains. He adds that the three-data-switch network approach was the most cost-effective means of connecting the university's asynchronous terminal users to its distributed data network.

The data net, which the university installed in 1979, was established to improve the standard of service to its users.

"We had to disperse our [processing units]," Gregory says. "We wanted to improve the system's flexibility without using a lot of leased lines, which are very expensive up here."

— Bob Wallace



Each location appears as a network node and connects 20 to 30 users to the data network.

Gregory claims about half of

*"The Juneau campus is linked to the campus in Fairbanks via a 19.2K bit/sec satellite link, and a 56K bit/sec link connects the Anchorage campus to Fairbanks. The network also connects community colleges."*



**Management from page 22**

technology to different business needs is the key skill.

The ability to capitalize on evolving technology from a long-range perspective is critical. A non-technical person is as poor a choice for this type of position as one who is too technical. The right choice is a person who has a strong foundation in one or more areas of information or communications technologies. Anyone interested in high-level management of merging technologies needs to expand his scope of knowledge. There are several ways to broaden one's expertise. The first is simple: Read more. Read trade journals from other professions. For those in telecommunications, read about information processing, robotics and other associated areas. Information processing professionals should read about telecommunications and office automation. Another method is to expand one's scope of knowledge in general business areas, and to get a good mix of company training and outside lectures. Go back to school for college classes in technical and nontechnical areas. Who runs the ship? The manager from information processing, from telecommunications or from office automation who can steer today's technology toward tomorrow's goal. □

**Pro from page 22**

that the bandwidth of the cable is divided into channels that are equivalent to one to three TV channels, resulting in data rates of 10M bit/sec or less.

Fiber, on the other hand, is treated as a digital baseband medium, so no modem is needed. The available bandwidth in one channel permits rates of 500M bit/sec in theory, but considerations of interface cost and compatibility with the telephone plant have led the 802.6 committee to adopt a rate of 43M bit/sec. (The actual rate is 44.7M bit/sec, but some bits are reserved for system maintenance.) This number is compatible with the DS3 circuits widely used for telephone trunking.

Although 43M bit/sec is a good compromise between the needs of a backbone network and the cost of implementation with present Cmos circuitry, the fibers are capable of much higher speed. The rates can be expected to rise by a factor of three or more if mono-mode fiber is used. Broadband cable does not appear to have this growth path.

Although such services are years away, they will drive fiber technology and ensure that fiber-based systems will be dominant. Today, the technical capabilities of coaxial cable and fiber are comparable. But the trend is clearly with fiber. □

**Con from page 23**

cable with no amplification can serve several hundred devices.

Optical signals tolerate much less loss than electrical signals. This is a problem for local nets, metro nets and other multipoint systems, where most of the signal loss is due to taps, splitters and couplers. Transmitter limitations make the problem worse for fiber. When combined with receiver limitations, the total loss between light source and detector in a fiber system must be 10,000 times less than that in a coaxial cable system.

The major considerations in choosing a networking medium are the types of services the network must carry and the distribution requirements. For long-haul, single-service, point-to-point applications, fiber is the way to go. For shorter haul single services, both technologies will suffice. Broadband coaxial systems are best for environments where users require multiple digital services, such as voice and data, and analog services like voice and video in a local area, such as a college campus, office park or industrial metro net.

Only when users carefully assess their communications requirements can they select the most efficient and practical networking medium. □

**Networking from page 23**

needs of DP users and those of the less technologically sophisticated user. Initially, the goal is a single logical network. Users should never see the complexity of the underlying physical networks.

Ultimately, the logical networks will merge into fewer and fewer physical networks. The number of gateways will diminish. Economies will be gained by simplifying network management, reducing network control centers, consolidating network operations and improving utilization of communications links. Integration technologies such as integrated services digital networks are important steps in the right direction.

Most companies today are far from the ideal of having one communications network. Communications professionals have an obligation to their corporation to understand the changing economics and the underlying technical trends in this rapidly moving industry. They must use that information to plan the evolution of their networks. How many communications networks are there? Two possible answers are correct. The answer "one" will do quite nicely. The other answer is that there are many today, but there will be only one tomorrow. □

**Token Ring from page 33**

Throughput to the host is dependent on transaction characteristics and the capabilities of the 3725. The more host communication required by users on the Token Ring, the fewer devices can be supported, Steen said.

The LAB-C costs \$23,760 and is scheduled to be available in January 1987. Token-Ring Interface Couplers cost \$3,000 each. IBM PC 3270 Emulation Program Version 3.0, also announced, is required for 3725 host connections (Version 2.0 was announced two weeks ago). It runs under PC DOS 3.1 and costs \$475.

Connection of the System/36 to the Token-Ring Network is achieved using a dedicated Personal Computer AT as a communications controller. It enables System/36s to communicate over the Token Ring with Personal Computers, other System/36s and System/370 hosts.

The System/36 is connected at a

proprietary channel speed to a new interface board for the Personal Computer AT called the System/36 LAN Attachment Adapter. The Personal Computer AT, in turn, is connected to the network using another new board called the Token-Ring Network PC Adapter II.

The Personal Computer AT, which executes software downloaded from the System/36, can be connected to two Token-Ring Networks. Each net connection requires a PC Adapter II board.

One model of the System/36, the System/36 PC model 5364, can be connected to the network simply using an adapter card and a new \$695 program called the System/36 PC 5364 LAN Communications Licensed Program.

By emulating 5250 terminals — the standard terminal of the System/36 — Personal Computer users can employ the larger computer as a file server and take advantage of 5250 applications, Steen said. This is made possible with PC Support/36, micro software updated for the network environment.

Personal Computer applications incorporating an APPC high-level program interface can also communicate with System/36 APPC programs, Steen said.

The PC Adapter II board costs \$895 and has a minimum monthly maintenance fee of \$65. The System/36 Local-Area Network Attachment board for the AT costs \$2,500. The hardware will be available in the second quarter of 1987. Software required includes the \$925 Local-Area Network Communications Licensed Program for the System/36 and, on the micro, the \$1,500 enhanced PC Support/36 program. The Personal Computer AT required is priced separately. □

**Big Blue analysts from page 1**

Network connections for System/370-type hosts and the System/36s before providing them for other IBM products reflects an earlier commitment, according to Frank Gens, a vice-president with International Data Corp., a research firm in Framingham, Mass.

Last October, IBM bared a software strategy that called for the Personal Services and Displaywrite programs to be implemented on System/370 hosts, System/36 office computers and Personal Computers. "IBM is providing a physical transport medium between the three levels of the processor hierarchy," Gens said.

Token-Ring links give the System/36 what Gens calls a "bit of a kicker as an office system," but he maintained that its role in departmental computing remains cloudy.

George Colony, president of Forrester Research, Inc., a research and consulting firm in Cambridge, Mass., agreed. "The System/36 is underpowered, lacks a real data base capability and has disk I/O problems," Colony said. Of 300 Fortune 1,000 companies surveyed by Forrester, only 5% said the System/36 was a good solution, compared with 35% that thought it was unworkable.

Digital Equipment Corp. and Wang Laboratories, Inc., Colony suggested, have the most to gain from the announcement. The product introduction fortifies the concept of departmental processing, but IBM cannot deliver its own solution for more than a year. "A year from now, the DEC Microvax III will be out and the Wang VS 7 will be here. The System/36 may be a dead product by then," Colony said. "This announcement shows

commitment to the System/36. It probably makes Ken Olsen and An Wang very happy," he added. Olsen is president of DEC and Wang is founder and chairman of Wang Laboratories, Inc.

The concurrent introduction of System/36 Token Ring support and host links to the Token Ring indicates IBM may be hedging its departmental system bets, according to David Terrie, editor of Patty Seybold's *Network Monitor*, an industry newsletter. "You have two options," Terrie said. "You can go with the System/36 and its applications base, or go with a Personal Computer network as a departmental system and link it to the host."

Although IBM's Advanced Program-to-Program Communications (APPC), also known as LU 6.2, is supported by both the Personal Computer and the System/36, Terrie does not expect it to play much of a role at this level of communications. "You won't see much cooperative processing between System/36s and Personal Computers," he said.

LU 6.2 will benefit users of both types of devices, however, by providing peer-to-peer links to devices upstream in Systems Network Architecture nets, Terrie said. "Clearly, LU 6.2 is going to be the communications protocol between almost every type of device above a dumb terminal in IBM networks," Gens said.

A sorely missed piece in IBM's networking strategy is an integrated network management system, Terrie noted. Although a network management program was released with the Token-Ring announcements, "IBM still lacks coordination with its centralized network management," he said. □

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Drugs from page 1

Recently, Electronic Data Systems Corp. proposed prescreening drug tests for prospective hires and random drug testing for current workers.

Industry giants AT&T and IBM both regularly perform drug screening for new employees, although AT&T restricts its tests to applicants for positions in its manufacturing facilities. AT&T officials say the company also tests workers who are suspected of drug abuse.

At last count, roughly 30% of the Fortune 500 companies had adopted prescreening urinalysis tests that indicate traces of drugs or alcohol in an applicant's system. Many companies based the decision

to begin drug screening on statistics from the National Institute on Drug Abuse (Nida), a Rockville, Md.-based research institute.

A 1983 Nida report indicated that 44% of individuals between the ages of 18 and 25 had experimented with drugs. Dr. Michael Walsh, chief of clinical and behavioral pharmacology at the institute, said that many persons in that age group are entering the work force for the first time.

Walsh said there is no data available that indicates what percentage of employees use drugs or what drug abuse costs individual companies. But the Nida study shows that U.S. businesses face a staggering \$65 billion annual productivity loss stemming from alcohol abuse and

another loss of \$35 billion due to drug abuse.

"Some companies reported that since their drug programs have been in place," Walsh says, "sick days and the number of accidents have dropped. But there is no way to be sure this is a result of drug screening."

**Fewer accidents**

A number of employers report fewer accidents and a lower rate of absenteeism since their testing procedures were put in place. Jim Healy, medical administrator for Chicago-based utility Commonwealth Edison, said the company made it clear that it would not put up with an employee reporting to work in an unfit condition.

"We don't have any statistical data that would prove that drug testing is the cause of any decline in accidents and absenteeism," Healy said.

"Nevertheless, based on the observations of the corporate medical staff, we feel our action to begin drug screening was justified."

An AT&T spokesman said the company's decision to begin screening prospective manufacturing employees was based on the belief that the results from most national reports on drug abuse were correct.

"We decided to take the stand that we didn't want to hire anyone likely to be impaired on the job," he said.

Although she declined to be identified, a communications manager with a major New York bank said that while she has never had a problem with staff drug abuse, she would not be opposed to routine drug testing.

"I would be very concerned if I thought someone running my network was using drugs," she said. "But I would also be equally concerned if a loan officer was high."

**Methods called inaccurate**

Employees have argued that methods of drug screening may not always be accurate. But Nida's Walsh said that the predominant drug test used by most companies, a urinalysis, is a dependable test for prescreening. "Although sometimes the thoroughness of laboratory personnel can be called into question," Walsh added.

Walsh said there are several reasons behind the growing corporate trend to adopt drug testing programs. One is the availability and affordability of new drug testing technology. Executives are also becoming increasingly aware of the high cost of health care and are feeling the pressure to try to reduce those costs.

While management in many companies has embraced the concept, some workers faced with drug tests have expressed concern over the ethics and legality of testing. Company drug screening has met with a flurry of lawsuits and media attention.

Walsh said most suits have not specifically addressed a company's right to test for drug use, but have argued for the fair and equal administration of screening procedures. Walsh said if a corporate policy is clearly written, administered fairly and consistently and all employees are kept informed, the legal problems can be minimized.

While prescreening is being used to reduce the number of drug users entering the work force, Walsh said companies are looking to tests of current workers to point out employees who may need drug dependency treatment.

"Most programs that screen existing employees are not set up to weed out and ax drug abusers," Walsh said.

"Employers just want to get those people treated and back on the job. With that kind of positive philosophy, there will be fewer legal challenges." □

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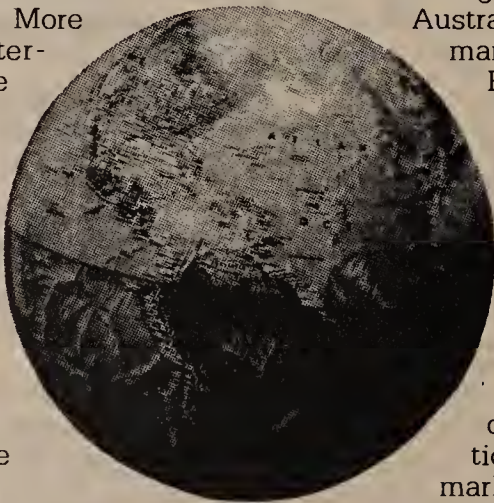
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**April 21-23, Dallas — Comtel '86 International Computer and Telecommunications Conference.** Contact: International Conference Management, Inc., Suite 1155, 15851 Dallas Pkwy., Dallas, Texas 75248.

**April 22, New York — Introduction to dBase.** Contact: Productivity Center, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

**April 22-23, Chicago — Planning the Next Generation of Telecommunications Networks.** Also, May 28-29, Boston; Nov. 12-13, Vienna, Va.; Dec. 10-11, San Francisco. Contact: Marji Clark, International Data Corp., Washington Division, Suite 240, 1500 Planning Research Drive, McLean, Va. 22101-5096.

**April 22-23, Los Angeles — Data Communications and Networks for Personal Computers.** Also, May 28-29, Washington, D.C. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

**April 24, Boston — Venture Fiber Optics.** Contact: KMI, America's Cup Ave. at 31 Bridge St., Newport, R.I. 02840.

**April 28-29, New York — Understanding Telecommunications Technologies for Nonengineers.** Also, May 14-15, Chicago. Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

**April 28-29, Cambridge, Mass. — Investment Opportunities in Telecommunications: An Executive Conference.** Contact: IGI Consulting, Inc., 214 Harvard Ave., Boston, Mass. 02134.

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**nual DEC-Compatible Exposition.** Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

**April 28-May 2, Fort Worth, Texas — The 16th Annual Conference on Computer Audit, Control and Security.** Contact: The EDP Auditors Foundation, Inc., P.O. Box 88180, Carol Stream, Ill. 60188-0180.

**April 29, New York — Spreadsheets Using Lotus 1-2-3.** Also, May 6, New York. Contact: Productivity Center, 450 Seventh Ave., New York, N.Y. 10123.

**April 30-May 1, Durham, N.C. — Southeastern Telecom Expo '86.** Contact: Jan Doutre, GTE Supply, Lakeside Plaza 2, 5225 Wiley Post Way, Salt Lake City, Utah 27704.

**May 1, New York — Symphony: The Spreadsheet.** Contact: Productivity Center, 450 Seventh Ave., New York, N.Y. 10123.

**May 7-9, New York — Introduction to Data Communications.** Also, May 21-23, Raleigh, N.C.; May 28-30, Washington, D.C.; June 2-4, Dallas; June 16-18, Chicago. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

**May 14-16, Chicago — The Information Center 1986 and Beyond.** Also, May 19-21, Boston. Contact: Information Processing Associates, Suite 210, 1455 Poplar Ave., Memphis, Tenn. 38104.

**May 15-16, Washington, D.C. — Computer III.** Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

**May 19-21, New York — Managing Telecommunications for Better Service & Reduced Cost.** Contact: American Management Association, 135 W. Fiftieth St., New York, N.Y. 10020.

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## ► PRODUCT REVIEW

**ADALink ties to 3270s***Offers remote site solution.***BY JOHN J. HUNTER**

Contributing Writer

A long-standing complaint of the IBM 3270 user population is that no means exist to let stand-alone remote terminals access a cluster controller via dial-up facilities. All remote users must attach directly to an IBM 3274 C controller or to an IBM 3276 control/display unit. Those products, however, are not cost-effective for sites with only a few 3270 terminals.

The 3270 is available in two versions: a local unit for direct connection to the mainframe's byte/block multiplexer and selector channels, and a remote unit that interfaces with the host computer's communications processor. The 3270 architecture calls for stand-alone terminals and printers controlled by cluster controllers that handle the interaction between the terminals and the host processor.

While IBM is allegedly working on a facility that will allow remote terminals to employ direct dial service, Adacom Corp. of Overland Park, Kan., is now offering this capability with ADALink. As shown in Figure 1, ADALink consists of two stand-alone interface boxes, one at the remote terminal site and

one that attaches to an IBM 3274 A-, B- or C-cluster controller at the host computer location. The remote interface box, called the CP-101L, contains an RG 62 A/U coaxial port for attaching an IBM 3270 Category A terminal (for example, 3278, 3279, 3178, 3179 and 3180) and a parallel port for attaching an Ascii printer. The latter unit allows local screen printouts.

The communications side of the CP-101L has an RS-232-C interface for use with dedicated or dial-up telephone lines. It handles synchronous data rates to 9.6K bit/sec and asynchronous rates to 19.2K bit/sec. Data is transmitted via an ADA-proprietary protocol to the ADALink box that interfaces with the IBM 3274 controller. That box, called the CP-100L, performs error detection and correction and converts the data into a form suitable

for use with the 3274. From there, the interaction between the host and controller proceeds normally. The CP-100L can be configured as a dedicated unit, or it can be accessed on a dial-up basis by multiple CP-101Ls.

The primary advantage of ADALink is that it provides a cost-effective solution to the problem of furnishing communications facilities to locations with only a few terminals. The cost breaks, however, will vary with the number of terminals at remote locations and the host access services they demand.

For example, one of the best applications for ADALink is its use as an alternative to IBM's 3274-51C and 61C controllers. Those units support eight and 16 terminals, respectively, and are priced at \$4,885 for an 8-channel 51C and \$7,600 for a 61C.

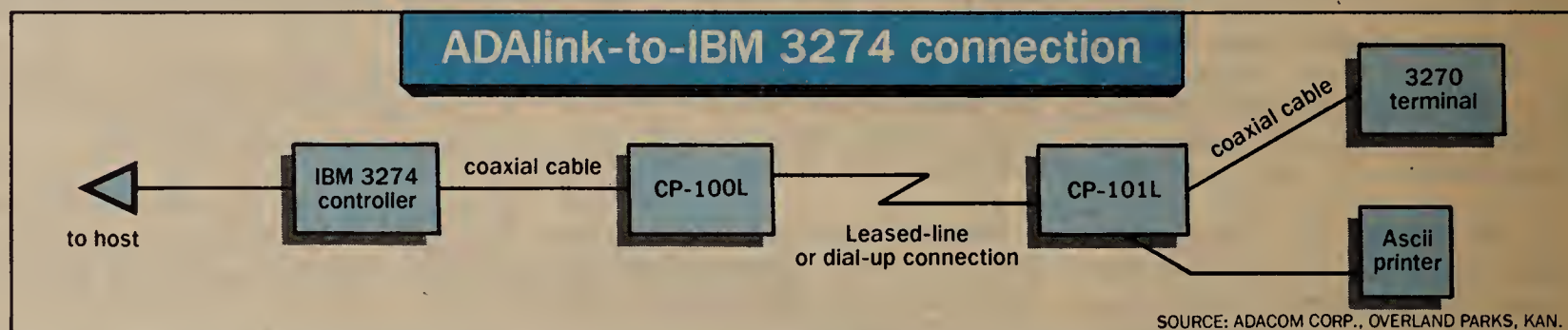
The 51C can be upgraded to handle 12 terminals for about \$1,000. With this sort of terminal-handling capacity, it is ludicrous to use a 51C or 61C at a location with only one or two terminals. For such applications, products like the ADALink

CP-100L and the CP-101L, priced at \$890 and \$760, respectively, look most attractive.

Another feature of ADALink that is particularly attractive is the local screen-print facility. Normally, print operations initiated by local terminals are directed to the host, which formats the data and returns it to a cluster-attached printer. With ADALink, users can directly transfer the contents of the screen to a locally attached Ascii printer without host intervention. Besides being convenient, this facility cuts costs and reduces the load on the controller and host by eliminating the need to transfer data to the host and back for printing on a cluster-attached printer.

Whether or not ADALink is the best solution depends on the level of host access that user terminals require.

If all terminals must be attached to the host simultaneously, then each will need a dedicated CP-100L and CP-101L. At a combined cost of \$1,650, anything over two or three terminals makes the eight-port 3274-51C look very attractive. ▀



SOURCE: ADACOM CORP., OVERLAND PARKS, KAN.

**Austec from page 3**

acts as a peer, said McNeill.

DDA will operate with any transport layer, whether RS-232, Ethernet or fiber-optic cable. DDA also supports dial-up lines, so users can initiate a program on a remote machine.

Because Austec has implemented DDA across all layers of the International Standards Organization's Open Systems Interconnect model except the physical layer, users could eliminate network operating software when configuring their network, McNeill said. However, Austec is modifying DDA to work with various network schemes when it implements Acebridge on a given piece of hardware. For instance, Austec has implemented DDA on AT&T's 3B2 line to support both RS-232 and 3B Net. McNeill said DDA could also be modified to support IBM's Systems Network Architecture.

Austec currently supports Unix and MS-DOS environments, as well as NCR Corp.'s ITX. "Our push has been to make Unix and MS-DOS work," McNeill said. IBM is one of several computer manufacturers licensing Austec's products.

IBM currently distributes ACE Cobol as its Interactive Executive Cobol. Austec also supports the IBM Personal Computer XT and Personal Computer AT with its products, and is in the process of porting them to Big Blue's Personal Computer networks and IBM's recently introduced reduced instruction set computer, the RT Personal

Computer. IBM, however, has not yet committed to distributing Austec's products.

AT&T recently began supplying its independent software developers with ACE Cobol and Acebridge. Independent software developers are using the products to help them migrate applications from Data General Corp. and other environments to AT&T's 3B line, said Art Grant, staff manager for vertical application acquisition in AT&T's Computer Systems Division in Morristown, N.J. He expressed excitement about Austec's distributed Cobol because it allows users to move the processing from one machine to another without the need to modify the application.

Analysts say Austec's claims sound promising. But Andrew Clark, senior analyst with Walter E. Ulrich Consulting, Inc. in Houston, warns that networking inevitably involves problems. "Even though they say it's independent of hardware, that can never be true," he said.

The fact that Austec currently supports only the IX 370 — IBM's mainframe Unix operating system — is a severe limitation, Clark said. "The real market for Cobol is the mainstream IBM mainframe world."

McNeill admits that IBM may balk at bringing Austec's Conformable Environment into its proprietary arena. However, users' demands to connect heterogeneous equipment could provide Big Blue with a strong incentive. ▀

**Nynex from page 3**

and Mountain Bell, a BOC of US West, the Denver-based RBOC.

He said Telco Research is also poised to sign distribution agreements with "several other RBOCs," and that it had no relationship with Nynex until the acquisition.

Nynex Development's acquisition of Telco Research continues the trend of software company acquisitions by RBOCs.

In addition to Nynex Development's purchase of The Data Group, Applied Data Research, Inc. was purchased for \$215 million by the Chicago-based Ameritech Corp., a deal that was completed in January. US West recently announced its intentions to acquire the Omaha, Neb.-based Applied Communications, Inc., a developer of electronic funds transfer software.

Nynex Development's Selig said the company considers acquisitions of software businesses a priority.

Telco Research is "one of the premier companies, if not the premier company, in the software area for network design and telecommunications management," Selig said. He added, "that was a specific capability we were looking for in an acquisition."

"One of Nynex's strategic missions is to become a leader in the information industry," Selig said. "In order to do that, [the company] needs to have many skills, some of which Nynex does not necessarily have now. We came out of a regulated [telephone company] base

with tremendous network infrastructures in New York and New England. However, we have realized that we have to add software capabilities to provide the integrated solutions customers are looking for," Selig said.

He added the acquisition of Telco Research had "one of the horizontal industry focuses" the company is looking for, compared with the purchase of The Data Group, which would serve a specific vertical market. Telco Research will be incorporated into Nynex Development as what Jewett described as "a wholly separate corporation," rather than into Nynex Business Information Systems, with which it will work most closely.

Jewett said he expected to continue "business as usual" after the acquisition.

He added that the firm would "retain top management and headquarters in Nashville. The only thing we expect to change are the resources available to us to do our business." He said the acquisition would enable the firm to "double its rate of growth."

Pointing to research studies into acquisition management, Jewett lauded Nynex's decision to manage his firm through Nynex Development, the subsidiary charged with evaluating and negotiating acquisitions.

"Studies of firms which have been acquired by larger firms have concluded that acquisitions are more successful when the smaller firm is left alone." ▀



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Now that you've memorized that, here's a partial list of why a Hayes® Smartmodem 2400™ is best for you.

1. The Hayes Smartmodem 2400 allows you to communicate with the vast installed-base of 300, 1200 and 2400 bps "Hayes-compatible" modems. The Hayes Standard "AT" Command Set allows you to use Smartcom II® and other software that communicates.
2. Through synchronous/asynchronous technologies, the Smartmodem 2400 permits your PC to access mainframes, minis, and on-line services previously inaccessible through asynchronous-only modems.
3. The Hayes Smartmodem 2400 is efficient...it pays for

itself in just 4 hours of annual use over long distance.

4. The technology of the Smartmodem 2400 allows you to transfer volumes of files with confidence across the city or

across the ocean using Bell and CCITT standards.

5. The new Smartmodem 2400B™—a plug-in board for the IBM PC and compatibles—allows synchronous and asynchronous communication through the same Com port.

6. You will also get the Hayes standard 2-year limited warranty and the opportunity to extend the warranty to 4 years.

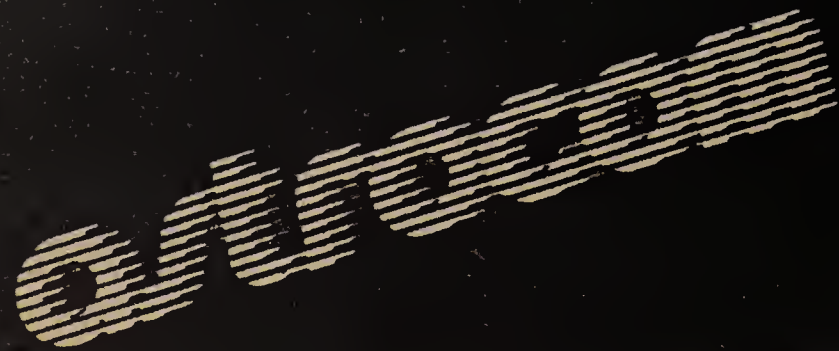
Best of all...you get Hayes. And that's all you ever really have to know!

For more information or technical specs, contact your authorized Hayes dealer. Or Hayes directly at (404) 441-1617.

Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Georgia 30348.



# A display of power.



The ATDM from Astrocom can multiplex data from up to six synchronous devices on to a single DDS 56K transmission link, CCITT equivalent 64K transmission link, or either of these speeds on private 4-wire 56K or 64K bps lines. It divides the bandwidth among its six channels in any combination of speeds from 2.4 to 19.2K bps.

ATDM set up and operation is extremely simple. The unique LCD command display lets you easily set port speeds, monitor system status and perform network diagnostics — no DIP switches to set. Parameters are downline loaded to remote units. Other features include:

- Eight user selectable speed formats
- Non-volatile RAM storage of parameters
- EIA signal propagation for tail circuits
- Local and remote loopback tests on a per channel basis
- Tabletop or rack-mount packaging

- Available with built-in DSU/CSU or short haul modem
- DSU/CSU, short haul option provides bit error rate display
- 220V/50 Hz available



And, at a price of \$1,395, you get a lot of power for the dollar. For more information call us at (612) 227-8651. It's time to make your power move!



Delivering solutions in data communications.

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